XC.
A704
V.20
#1-2

CARNIVOROUS PLANT NEWSLETTER

VOLUME 20, NUMBERS 1 & 2 MARCH & JUNE 1991

CARNIVOROUS PLANT NEWSLETTER

Official Journal of the
International Carnivorous
Plant Society

Volume 20, Numbers 1 & 2
March & June 1991

Front cover: *Utricularia hamiltonii*—Near Darwin, Australia. P. Taylor/Kew photo.

Rear cover: Peter Taylor in a northern Michigan fen on Lake Huron, walking among *Utricularia cornuta*. July, 1990.

The co-editors of CPN would like everyone to pay particular attention to the following policies regarding your dues to the ICPS.

All Correspondence regarding dues, address changes and missing issues should be sent to ICPS c/o Fullerton Arboretum, CSUF, Fullerton, CA 92634. DO NOT SEND TO THE CO-EDITORS. Checks for subscription and reprints should be made payable to ICPS.

All material for publication, comments and general correspondence about your plants, field trips or special noteworthy events relating to CP should be directed to one of the co-editors. We are interested in all news related to carnivorous plants and rely on the membership to supply us with this information so that we can share it with others.

Views expressed in this publication are those of the authors, not necessarily the editorial staff.

CO-EDITORS
D.E. Schnell, Rt. 1, Box 145C, Pulaski, VA 24301
J.A. Mazrimas, 329 Helen Way, Livermore, CA 94550
Leo Song, Dept. of Biology, California State University, Fullerton, CA 92634
(Bitnet Address: LEOSONG@CALSTATE)
Seed Bank: Gordon Snelling, 321 1/2 W. Palm Avenue, Monrovia, CA 91016

ACTING BUSINESS MANAGER AND MANAGING EDITOR: Leo C. Song, Jr.

PUBLISHER: The International Carnivorous Plant Society by the Fullerton Arboretum, California State University, Fullerton, CA 92634. Published quarterly with one volume annually. Typesetting: Marilyn Medlin, Public Affairs Office, California State University, Fullerton, Fullerton, CA 92634-9480. Printer: Kandid Litho, 129 Agostino Road, San Gabriel, CA 91776. Dues: $15.00 annually. $20.00 foreign. Reprints available by volume only © 1991 Carnivorous Plant Newsletter. All rights reserved. ISSN #0190-9215. Circulation 623 (117 new, 506 renewal).

Editor's Corner

by

Leo C. Song, Jr.
Acting Business Manager

Welcome to our twentieth year. This special double issue is dedicated to Peter Taylor and his work on the genus *Utricularia*. Peter's magnum opus **The Genus Utricularia** is now available for purchase. A special brochure and order form is included with this issue. It is an invaluable addition to any C.P. library.

NOTICE

A New 1991 World Carnivorous Plant List

By Jan Schlauer, Zwischenstr. 11, 6000 Frankfurt/Main 70,
Federal Republic of Germany

The CP listing published in CPN 15:59-117 (1986) has been updated and a reference placed to every single name included, which makes literature searches easier and more efficient. This list amounts of 80 pages and due to increased mailing costs in Germany, it is impossible for me to mail the list all over the world for the old price.

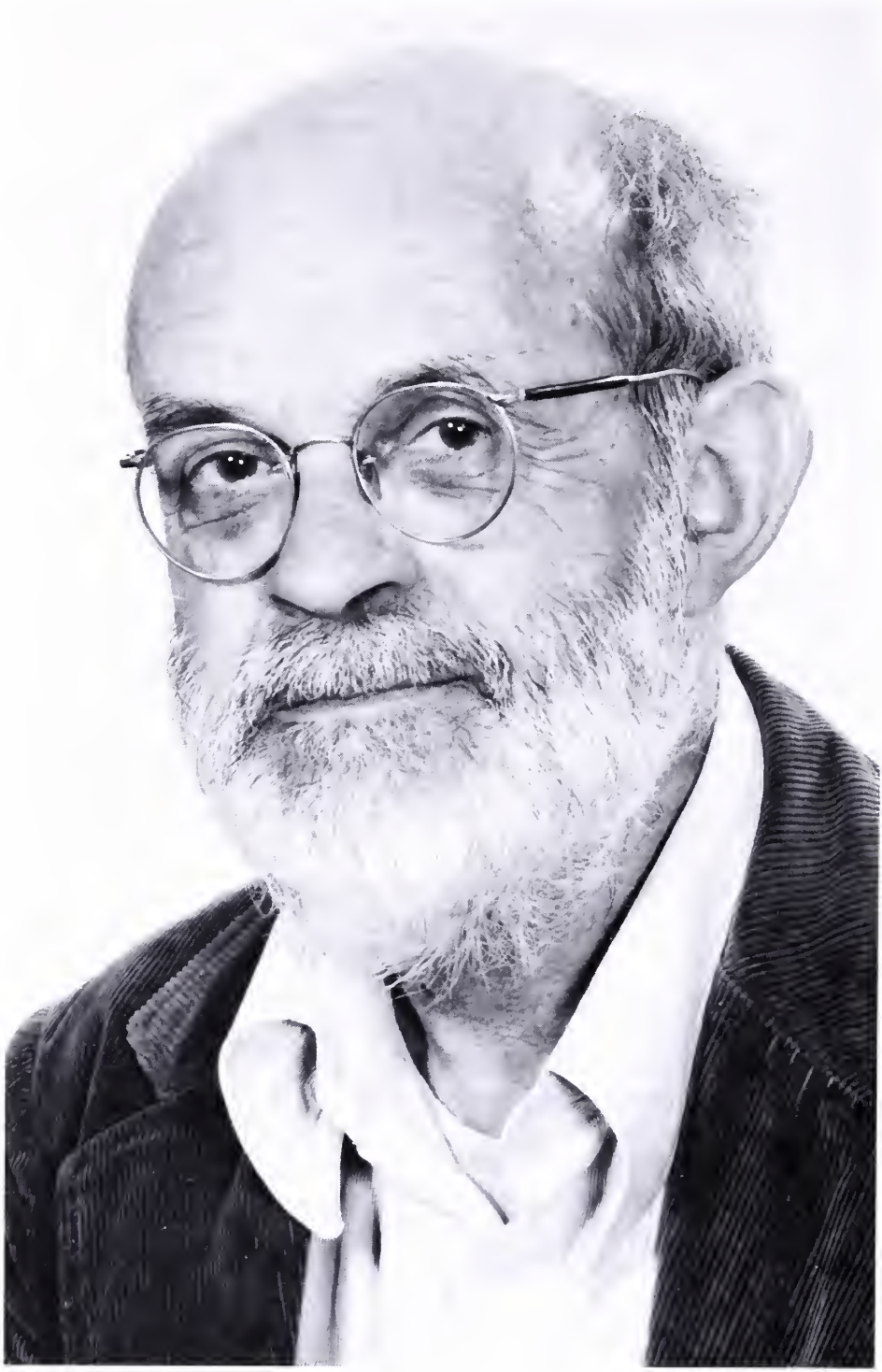
The list is available for the following rates:

Europe: US $15 or DM 22,50
Overseas: US $20 or DM 30,-

LIBRARY
SEP 9 1991
NEW YORK
BOTANICAL GARDEN

UPCOMING ARTICLES

- First verified case of *Sporotrichosis* in an ICPS member
- Plant VS animus
- What is the identity of the West Gulf Coast pitcher plant?
- Field trip to Darwin & Kununurra for CP
- *Nepenthes* growing media
- CP of Caraça, Brasil
- *Pinguicula vulgaris* along the Alaska Pipeline
- Marl fen in Lower Michigan
- Growth effects of mineral nutrients applied to the substrate or onto the leaves of 4 CP species
- Mechanisms of trap movement I: Rapid growth in *Drosera, Dionaea* & Scientific notions of how Venus's flytraps close.
- CP in Ireland III.



Peter Taylor

A Special Issue Dedication — To Peter Taylor

By Donald Schnell

It has been a good number of years since we dedicated a special issue of CPN to a prominent CP botanist, the first and only being in honor of Edgar T. Wherry (Vol. 2, No. 3). We do not have a set policy of regularly dedicating issues of CPN, but wait until a candidate clearly emerges.

After forty years of dedicated work, Peter Taylor obviously deserves this honor, particularly after completion of his summary monograph, THE GENUS *Utricularia* as a special Kew Bulletin issue of considerable weight and dimension. As was so aptly pointed out by the Director of Kew, the work was no small task considering the worldwide distribution of so many species (see review, CPN 19:51-52, 1990).

In addition to dedicating the issue to Peter, we have also updated our previous rendition of the worldwide *Utricularia* list, based entirely on the monograph. There is a brief biography of our honoree, along with his photo, and several other good things.

Unlike the Wherry issue and similar dedications in other publications, we put Peter to work! He has written an entirely new key for the utricularias of North America (The monograph key included all of the Americas) and it is unique in that it can be used for flowering or non-flowering specimens. The first split in the key is flowering vs. non-flowering and it essentially breaks into two keys after that. The key is far more accurate than a previous one we printed in CPN (CPN 2:66-69, 1973), and the vegetative part of the key is the first of that sort that I have found at all usable in this genus, although it requires some specimen magnification in some steps. The biography for this key is, of course, Peter's monograph, so we have not repeated that here.

We decided to push our luck and mentioned *Genlisea*, and there came forth a revised world list of species to date of publication, along with a worldwide key and complete, new bibliography! For both utricularias and genliseas, there is a sort of "mini-monograph" narrative commentary on each species. Finally, Peter produced five plates of his famous line drawings to illustrate points in both keys and his glossary to accompany both keys.

We are certainly grateful to Peter for all of this, and much of it is primary publication here. Most of the color photos are first time printing of some unusual Australian species in particular.

Peter visited Washington, DC in the USA in early July, 1990, to receive the prestigious Engler Medal from the IAPT which was meeting there last year, the medal honoring his work and monograph. While in the country, Peter and I got together for some days of botanizing in the Great Lakes region. After several days of tromping through inland sphagnum bogs and lakefront fens together, we got to know each other pretty well, or rather somewhat reaffirming our impressions of each other gained by intuition or reading between the lines in correspondence. In one bog, he remarked, "This is one of my happiest times, when I can wander in a piece of vegetation such as this...", and I am glad this was provided him. We found nearly all of the utricularias of the area that trip, in spite of high water and an unusually cool preceding June.

On a personal note, it is difficult to summarize one's feelings about such a man who has traveled the ends of the earth to study plants for one of the premier botanical gardens of the world. Friendly, understanding, kind, helpful and willing to inform without lecturing, full knowledge of his subject even to the extent that he was willing to admit his limitations (find that in many experts!), generous, sensitive, considerate, a broad interest in things in general, a true gentlemen—These are just some impressions that come to mind in no particular order. I am pleased and honored to count him as a friend, and to wish him many more productive years in his "retirement" with his hobbies and continued contributions to regional floras of the world.

PETER TAYLOR
A Short and Informal Biographical Sketch

By Donald Schnell

"Though there is endless room for observation in the field of nature, which is boundless, yet investigation (where a man endeavors to be sure of his facts) can make but slow progress; and all that one could collect in many years would go into a very narrow compass."

Gilbert White
from Natural History of Selborne
1789

Peter Taylor was born in 1926, and when he was eleven years old, unknown to young Peter of course, a man from Kew named Edgar Milne-Redhead made a collection of species of *Utricularia* in what is now Zambia, and placed them in alcohol rather than make the usual pressed specimens. This was ultimately to steer Taylor's career, but in the meantime as a child, he taught himself botany and entomology and had a great interest in natural history in general. If pressed to name "patron saints" of his interest, he would certainly mention Gilbert White whose 1789 book, Natural History of Selborne was quite available to him. Ultimately, he was to name his first-born son Gilbert in his honor. Another inspiration was the French entomologist Jean Henri Fabre, english translations of whose works were studied by Taylor since he was about thirteen when he borrowed the books from a local library. He now reads his own copies of some of the original French editions to hone his knowledge of the language.

By age 16, World War II had begun in full force and there was work to be done. Taylor found himself in his first job working as an apprentice to the trade of machinist in a five year training program in a factory manufacturing armored cars and military trucks. Towards the end of this period he met a local school teacher who was working on a flora of Taylor's home county. This man later went on to acquire his PhD and to become for years the secretary of the Botanical Society of the British Isles.

Through this man, Peter met a Kew botanist serving in the army at that time, and after the war he was invited to join the Kew staff. Meanwhile, Taylor finished his apprenticeship and won first prize as the best apprentice of the year. But at that moment, he was off in Scotland for a week's unpaid leave to attend a botanical society excursion, quite prophetically.

Taylor botanized the west of England by bicycle and collected his first *Utricularia* specimen, *U. vulgaris*, which was deposited in Kew. In 1948, Peter finally accepted the offer from Kew, and his foreman at the factory upon hearing of his imminent departure offered him an extra penny an hour! Although he would start at a lesser salary at Kew, Taylor had made his decision.

In order to supplement his income, he would do evening work, illustrating, proof reading, etc. This talent as a draughtsman came to the attention of Milne-Redhead and he asked Taylor to make enlarged drawings of those Zambian utricularias collected back in 1937. During this task, Taylor became fascinated by these interesting plants and was encouraged to study them, but largely in his own time evenings, holidays and weekends. Meanwhile, he had a new wife and eventually three children to support and give some attention to, so the road was not easy as Taylor was assigned various tasks in the Kew Herbarium.

His *Utricularia* work proceeded slowly but persistently. In 1954, he named his first species (*U. pentadactyla*), and later that year finished an account of the

Lentibulariaceae for the "Flora of Trinidad and Tobago". For many years in his youth, ferns had been Peter's greatest interest. But a bid to head the fern department at Kew failed, and financial circumstances compelled him to sell his personal herbarium of fern duplicates numbering some 1000 to the New York Botanical Garden, and his fine collection of fern books to the Hunt Library. The die now seemed cast to bladderworts.

Eventually, Peter was named to head the orchid section of the Herbarium at Kew, and continued his work on utricularias in his spare time, or on the side when on orchid field trips to various lands. He refined and promulgated the concept that the best specimens of *Utricularia* were those collected in liquid and eventually accumulated several thousand personally collected specimens deposited in Kew. His early success contributing to regional floras resulted in a flood of requests, some of which are still waiting to be fulfilled. He soon recognized that half the genus was American, so made field trips to South America, and briefly for a few fellowship sponsored months in the United States in 1972 where he stayed in northern Florida, journeying out in a rented car to the field. He visited the Carolinas and the herbaria in Cambridge, Massachusetts, Washington DC and New York.

Now head of the orchid section, he was able to occasionally leave his assistant and heir designate of the section for more botanizing. In 1979 and 1980 on separate occasions, he spent weeks in all the continental states of Australia where he discovered the richest single area of *Utricularia* species diversity in the Northern Territory south and east of Darwin (he saw some 30 species). But the traveling, long hours, tropical climates and general intensity of his work had taken a toll and he returned to Kew in somewhat indifferent health.

But by 1981, he was back in the field in India. A few years before his retirement from Kew in 1986, he was finally permitted to devote his full time to completing what some years before had germinated from his earlier studies, a worldwide monograph on the genus *Utricularia*. Before leaving Kew, he was able to complete all of the now famous Taylor line drawings and much of the text, but two more years—again, his own time—were required to complete the work which appeared in November, 1989, some forty years after beginning his studies of the genus.

Among his awards have been the "Kew Medal" in 1989 for "the high standards he achieved in his work at Kew". In July, 1990, he attended the meeting of the IAPT in Washington DC to receive the prestigious "Engler Medal" for his *Utricularia* monograph.

"Retirement" for Peter Taylor was not to mean a rocking chair in front of a fireplace somewhere. Wisely, and tellingly, he invested in a copying machine and word processor, and moved with his wife to a small woodlot he bought. He describes the woods as depauperate and his work to renovate it, and he is now able to have a steady supply of timber to pursue one of his many hobbies and avocations, woodworking. He even built a small sawmill and sometimes cuts as much at 500 board feet of timber. The lumber must dry, of course, and sometimes the season does not cooperate, so it dries often scattered in the house where his very patient and loving wife puts up with it, as well as his woodworking projects seemingly going first to friends and others asking for them. He has also been able to see or collect almost half of the British butterfly fauna on his own property, some 25 species.

Meanwhile, he is still writing about utricularias. He just completed the genus section for Flora Australia, and as you can see in this issue of CPN, completed quite a bit of work for us.

In the Preface to his monograph on the genus *Utricularia*, Taylor writes: "In the long course of the preparation of this work I may have lost only a small amount of blood, but I have certainly lost a lot of sleep, shed much sweat and not a few tears. However, it has given me an enormous amount of satisfaction and pleasure." A job very well done; and from all of us—Thanks, Peter!

Utricularia in North America North of Mexico

By Peter Taylor

Introduction

Utricularia is, for the greater part, a genus of the tropical regions of the world, and is represented in the United States and Canada by only 19 of 214 species recognized worldwide. All of the rather few species which occur in Canada are also found in the United States, and within the latter country all of the 19 can be found in the eastern coastal states from Maine to Texas, although some extend further west and 6 species are recorded as growing in the Pacific northwest. Five species are endemic in the region, and one extends no further south than Cuba (just inside the tropic of Cancer). Four northern species are also found in temperate Europe or Asia (or both), two are very widespread pan-tropical species, while the rest are either more or less widespread in the eastern coastal plain and extend for varying distances southwards into the tropics, or are essentially tropical species which just reach the warmer southern states, and two of these get no farther north than Florida.

Those aquatic species that are more or less confined to the cooler northern regions, pass the winter as turions (sometimes called winter buds). These are small, globose or obovoid organs, which form at the apex of stolon branches in the latter part of the growing season. On examination they are found to consist of very numerous small, modified leaves, densely clustered on an abbreviated stolon. They are said to sink to the bottom during the winter, rising to near the surface in the spring, when they elongate and eventually produce new plants. The tropical aquatic species never have these turions but either vegetate continuously, or some species are known to produce tubers during dry periods. The terrestrial species either vegetate continuously, under permanently wet and warm conditions, or produce seed and behave as annuals. The flowers are adapted for pollination by insects but many, or possibly most, are autogamous (that is, self pollinating).

I have seen 15 of the 19 species growing in their natural habitats in the United States and am familiar in the field with two others (in Europe and tropical America). The remaining two, (*U. simulans* and *U. geminiscapa*), are known to me only as dried and pickled herbarium specimens. The key is based almost entirely on my own personal experience of the species. It allows for commonly encountered variations, and some are keyed out more than once, but many of the species are morphologically rather plastic, to a greater or lesser degree, and I am quite prepared to learn that atypical forms will not key out, especially when flowers are absent. It seems to be impossible to distinguish *U. juncea* from *U. cornuta* from vegetative material alone, although Kondo (1971) considered that there was a significant difference in seedling morphology.

In a few cases I have had to resort to microscopic characters in the "flower absent" part of the key, but only where I felt it was absolutely necessary (for instance, I cannot certainly distinguish sterile *U. geminiscapa* from *U. macrorhiza* in a similar condition, without looking inside the traps at the quadrifid glands). These glands, the function of which has been the subject of much speculation and discussion, are usually not difficult to observe with the aid of a microscope. They are present in all species, and are usually about one tenth of a mm long, or less, and are to be found on the inner side of the trap wall. In the case of *U. macrorhiza* and most other aquatic species, those near the trap mouth have two arms, those elsewhere have four. Darwin called them bifids and quadrifids. In some terrestrial species the number of arms is reduced to one and two respectively, while in one species, found in tropical America, all of the glands have a single arm. In order to examine them I usually cut a living or pickled trap in half longitudinally (under a low-power dissecting microscope), and put the trap, inner side

uppermost, under a cover slip and examine at a high magnification under a compound microscope. The arms vary, in different species, in their shape, their proportions (some are relatively long and thin, others short and fat), and especially in their disposition relative to each other. It must be stressed that their morphology cannot always be used to distinguish species, as glands that are the same or extremely similar are found in groups of related species, or sometimes in quite unrelated ones.

Key to Species of *Utricularia* Occurring in America North of Mexico

(P. T. October 1990)

1. Plant complete, with vegetative parts and inflorescence, including flowers.

2. Lateral lobes of the lower lip of the corolla saccate; leaves verticillate on the stolons, each divided into verticillate segments; traps terminal on all or most of the leaf-segments, the mouth with no appendages, but the door with a central fascicle of gland-tipped hairs (aquatic with bracts that are usually basiosolute but sometimes basifixed; corolla pink) *purpurea*

2. Lateral lobes of the lower lip not saccate; leaves not verticillate

3. Brack peltate, corolla either chasmogamous, yellow, with a distinctly 3-lobed lower lip, or cleistogamous, whitish or pinkish, very small and bud-like; traps with 2, dorsal, sparsely branches appendages (terrestrial, leaves simple, narrowly linear) *subulata*

3. Bract not peltate, basifixed, but may be more or less auriculate.

4. Calyx lobes, bracts and bracteoles with deeply fimbriate margins; traps with a simple dorsal and a 2-fid ventral appendage (terrestrial; leaves simple, narrowly linear; corolla yellow) *simulans*

4. Calyx lobes, etc, not fimbriate; traps other than above.

5. Bract tubular, encircling the pedicel; leaves filiform, terete, septate; (terrestrial or affixed shallow water aquatic; flower solitary, corolla pink; traps with 2, dorsal, setiform, branched appendages and several simple ventral setae) *resupinata*

5. Bract not tubular; leaves not septate

6. Leaves simple, spathulate; bract and bracteoles basally connate, forming what appears to be a 3-fid bract; traps with 2 dorsal, narrowly deltoid (triangular) appendages, which are densely beset with curved, gland-tipped hairs; capsule dorsiventrally 2-valvate (terrestrial; corola yellowish, white or violet, the lower lip 3-lobed, shorter than the spur) *amethystina*

6. Leaves not spathulate; bracteoles, if present, free from the bract; capsule never dorsiventrally 2-valvate

7. Bracteoles present, much narrower than the bract; terrestrial; leaves simple, narrowly linear; traps without appendages; corolla yellow

8. Corolla 1,5-2 cm long; inflorescence usually short, congested, few-flowered
cornuta

8. Corolla 0,2-1 cm long; inflorescence elongate, lax, several-to-many-flowered
juncea

7. Bracteoles absent; suspended or affixed aquatic; leaves absent or compound, dichotomously or pinnately divided into filiform segments, the segments usually with apical and lateral setae; traps with 2, dorsal, setiform, more or less branched appendages and often also with ventral setae; corolla yellow or white.

9. Leaves always absent, the stolons bearing only traps; minute suspended aquatic, often growing among other aquatic plants, including other species of Utricularia; peduncle extremely short, the pedicels appearing to arise directly from the stolon; corolla whitish, about 2 mm long, the spur saccate; calyx margin entire in flower, denticulate in fruit; capsule elongate, indehiscent, 1-seeded
olivacea

9. Leaves present; suspended or affixed aquatic, peduncle well developed; corolla yellow, more than 5 mm long unless cleistogamous; calyx margin never denticulate; capsule globose, circumscissile or indehiscent, severel-to-many-seeded.

10. Peduncle with a whorl of floats; lower lip of corolla 3-lobed; (each leaf with two primary segments, thus dividing it into two halves; suspended aquatic)

11. Floats tapering gradually from the base to the widest point at or near the middle; the two halves of the leaf unequal in size and shape; bracts longer than wide, entire; flowers mostly 9-14, the corolla with spur apex 2-fid.
inflata

11. Floats more or less parallel for most of their length, tapering abruptly to the base; leaves with the two halves equal in size and shape; bracts wider than long, with apex 3-dentate; flowers mostly 3-4, the corolla with spur apex almost always entire
radiata

10. Peduncle without a whorl of floats

12. Chasmogamous inflorescense with one or more cleistogamous flowers at the base or chasmogamous inflorescence sometimes absent and only cleistogamous flowers present; lower lip of chasmogamous corolla 3-lobed; bract ralatively narrow, about 3 times as long as wide; seeds disk-shaped, not winged (suspended aquatic) *geminiscapa*

12. Chasmogamous inflorescence never with cleistogamous flowers at its base; lower lip of corolla entire, the apex rounded or emarginate; bract wider than long or not more than 2 times as long as wide.

13. Upper lip of corolla larger, or at least as large as, the lower, shallowly 3-lobed; leaf-segments terete; capsule laterally 2-valvate; seeds lenticular, smooth or verrucose, with an irregular wing; bract wider than long.

14. Leaves of two quite distinct kinds, some with more or less numerous green segments and few or no traps, others, usually below the substrate, with fewer whitish segments and numerous traps; inflorescence usually more than 2-flowered.

15. Terrestrial or shallow water affixed aquatic with green leafy shoots superficial, usually not more than 10 cm long and 2 cm total width; peduncle erect, straight, mostly 10-25 cm long, almost entirely emergent; seeds verrucose, but the wing margin not dentate. *striata*

15. Deep water aquatic, anchored in mud in water up to 1 m deep, with green leafy shoots submerged, up to 40 cm long and 5 cm total width; peduncle flexuous, up to 1 m long, only the apical 10 cm emergent; seeds verrucose and the wing margin conspicuously dentate. *floridana*

14. Leaves all more or less the same, green, with few segments and few traps; inflorescence usually not more than 2-flowered; shallow water aquatic or terrestrial on mud; seeds smooth or sometimes verrucose. *gibba*

13. Upper lip smaller than the lower, not 3-lobed, the apex rounded or emarginate; bract longer than wide; leaf segments terete or flattened; capsule circumscissile or indehiscent.

16. Stolons flattened; capsule indehiscent; seeds thinly lenticular with a narrow regular wing (robust suspended aquatic; pedicels decurved after flowering) *foliosa*

16. Stolons terete; capsule circumscissile; seeds polygonal, narrowly winged on all the angles.

17. Spur of corolla short, subsaccate, wider than long when viewed laterally (small affixed aquatic of shallow water in bogs, some leaf-segments flattened; bract auriculate) *minor*

17. Spur longer than wide; the apical half cylindrical or narrowly conical.

18. Leaves or one kind only, with numerous terete segments and bearing traps; apex of spur curved upwards; bract not, or scarcely, auriculate; deep water suspended aquatic *macrorhiza*

18. Leaves of two kinds, some superficial, with flattened green segments bearing few or no traps, others more or less buried in the substrate and bearing traps; apex of spur not curved upwards; bract auriculate; shallow water affixed aquatic.

19. Green leaf-segments with apex obtuse and lateral margins not toothed but bearing numerous (9-20) short setae; corolla with spur about as long as the lower lip. *intermedia*

19. Green leaf-segments with apex acute and lateral margins with few (4-9) distinct teeth, each bearing a short spical seta or setae; corolla with spur considerably shorter than the lower lip. *ochroleuca*

1. Vegetative parts only present.

20. Leaves simple; affixed terrestrial or subaquatic.

21. Leaves spathulate (terrestrial) *amethystina*

21. Leaves linear or filiform.

22. Leaves terete, filiform, septate (terrestrial or shallow water affixed aquatic) *resupinata*

22. Leaves flattened, narrowly linear, not septate.

23. Traps with oral appendages.

24. Traps with 2 dorsal, subulate, sparsely branched appendages (terrestrial, but sometimes in shallow water) *subulata*

24. Traps with 1 dorsal, subulate appendage and 1 deeply 2-fid ventral appendage (terrestrial) *simulans*

23. Traps without appendages (terrestrial, but often in shallow water) (It is not possible to distinguish these two species on vegetative characters) *cornuta & juncea*

20. Leaves absent or divided into terete or narrow flattened segments; suspended or affixed aquatic.

25. Leaves absent, only traps arising from the stolons (minute suspended aquatic) *olivacea*

25. Leaves present.

26. Leaves verticillate and divided into verticillate segments, all or most of which bear terminal traps with no oral appendages (suspended aquatic). *purpurea*

26. Leaves not verticillate, nor with terminal traps.

27. Stolons flattened (robust suspended aquatic) *foliosa*

27. Stolons terete.

28. Suspended aquatic; leaves of one kind only.

29. Leaves with traps lateral on terete leaf-segments and also a few, somewhat different, smaller traps present at the very base of the primary segments.

30. Quadrifid glands inside the proximal part of the trap with the two pairs of arms parallel or almost so. *geminiscapa*

30. Quadrifid glands inside the proximal part of the trap with the two pairs of arms divergent. *macrorhiza*

29. Leaves with traps lateral on terete or flattened leaf-segments but never with different traps at the base of the primary segments.

31. Leaves with few segments (usually not more than 4, but sometimes up to 8) (a common form of this, normally affixed, shallow water aquatic, which rarely produces flowers) *gibba*

31. Leaves with more than 10 segments.

32. Leaves each with two primary segments and thus divided into two halves.

33. Leaves with the two halves equal, the primary segments longer than the subsequent ones. *radiata*

33. Leaves with the two halves markedly unequal, one, at least, of the two primary segments not longer than the subsequent ones. *inflata*

28. Affixed aquatic, in deep or shallow water or mud or sometimes in floating rafts of living or dead plants.

34. Leaves not clearly of 2 distinct kinds, all green and usually bearing more or less numerous traps.

35. Leaves with few segments (usually not more than 4, but sometimes up to 8). *gibba*

35. Leaves with more than 10 segments.

36. Plant bearing numerous small tuber-like organs on shoots which descend into a mud substrate; leaf segments terete, with lateral setae (a form of this, normally deep water aquatic, induced when stranded on mud) *inflata*

36. Plant not bearing tuber-like organs; leaf segments terete or flattened, without lateral setae (quadrifid glands inside the proximal part of the trap with one pair of arms reflexed so that all 4 arms point in the same direction) *minor*

34. Leaves of two quite distinct kinds, some green with few or no traps, others whitish, bearing more or less numerous traps and buried in the substrate.

37. Deep water affixed aquatic, anchored in mud up to 1 m below the water surface; green leaves on long plume-like shoots, up to 40 cm long, and 5 cm total width, the segments terete. *floridana*

37. Shallow water affixed aquatic with the green leafy shoots superficial, the segments terete or flattened.

38. Leaf-segments with apical, but without lateral, setae; quadrifid glands inside the proximal part of the trap with one pair of arms reflexed, so that all four arms point in the same direction. *minor*

38. Leaf-segments with apical and with lateral setae; quadrifid glands not with all four arms pointing in the same direction.

39. Green leaf-segments terete, the margins not toothed, but bearing 3-6 short setae. *striata*

39. Green leaf-segments flattened.

40. Green leaf-segments with apex obtuse, the margins not toothed, but bearing 9-20 short setae; quadrifid glands inside the proximal part of the trap with both paris of arms parallel. *intermedia*

40. Green leaf-segments with apex acute, the margins with 4-9 distinct teeth, each terminating in a short seta or setae; glands inside the proximal part of the trap with both pairs of arms divergent. *ochroleuca*

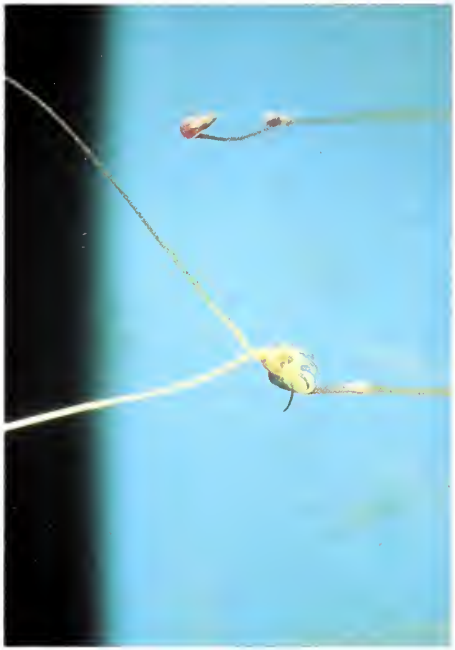
Notes on Distribution of North American *Utricularia*

1. ***U. amethystina*** *St. Hil.*

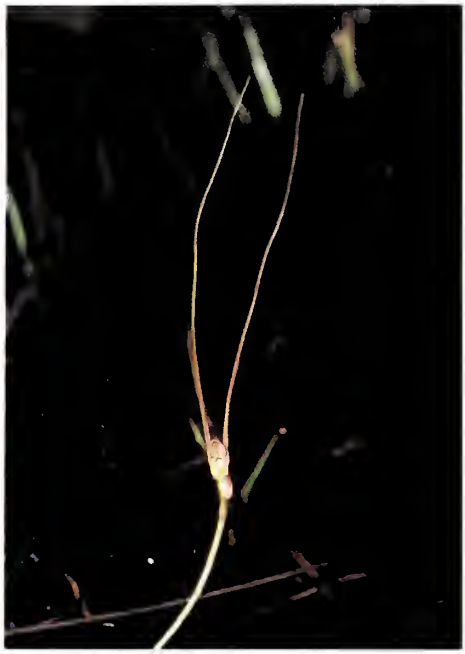
This tropical species has been found on two occasions in peninsular Florida. Elsewhere it has a very wide distribution in America from Mexico to Peru. It grows in wet sand or peat in open vegetation, although it will tolerate more shade than most terrestrial species. First discovered in the USA by Jeanette P. Standley near Fort Meyers and described by Barnhart as *Calpidisca standleyae*. Subsequently it was found again by Len Brass in Collier County. Don Schnell has searched for it in recent years, but has so far failed to locate it. The spathulate leaves, which are almost invariably present at flowering time, and the connate bract and bracteoles, are both diagnostic among North American species.

2. ***U. cornuta*** *Michx*

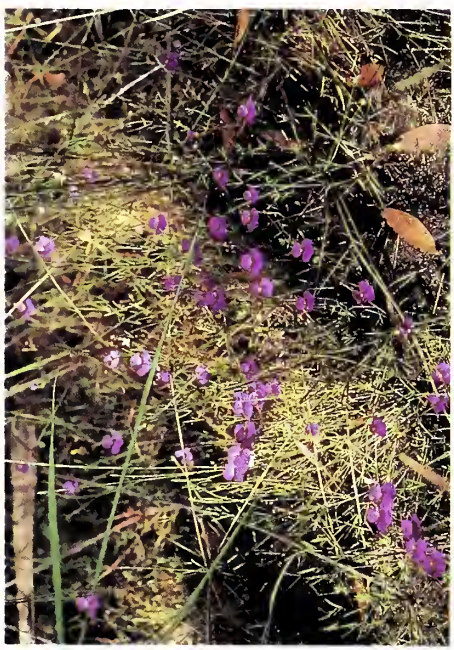
This occurs in north America, Bahamas & Cuba. In Canada it is found from Newfoundland and Nova Scotia westwards to Alberta, and in the United States in all of the eastern states and westwards to Minnesota, Wisconsin, Michigan, Illinois and Arkansas ("Washington" is included in my monograph, but this is a mistake, specimens exist so labelled, but almost certainly in error). It grows in wet soil or shallow water up to about 10 cm deep in fens, marshes and swamps, probably usually on acid soil. This species is very similar to *U. juncea* and often confused with it. Kondo, in his key to the North American *Utricularia* species,



Utricularia capilliflora—Near Darwin, Australia. P. Taylor/Kew photo (with assistance by Dr. Arthur Weston). Note erect corolla appendages in this small, annual terrestrial.



Utricularia dunstaniae—Near Darwin, Australia. P. Taylor/Kew photo (with assistance by Dr. Arthur Weston). Note erect corolla appendages.



Utricularia lasiocaulis—Near Darwin, Australia. P. Taylor/Kew photo.

Utricularia fulva—Near Darwin, Australia. P. Taylor/Kew photo. A group of plants.

uses as his primary character for distinguishing the two species the color of the peduncle (scape), that of *U. cornuta* being said to be 'green to yellowish-green' and of *U. juncea* 'greenish-purple to purple'. I have not seen the latter species flowering in the USA and cannot vouch for the reliability of this character, and I have seen *U. juncea* flowering in Trinidad, West Indies with a green peduncle. The pollen grains of *U. cornuta* are larger than those of *U. juncea*. Where the two species are sympatric the former usually flowers earlier than the latter.

3. ***U. floridana*** *Nash*

This most interesting species is endemic in the United States, where it occurs in Florida, Alabama, Georgia and the Carolinas. It grows in water up to 1 m deep in oligotrophic lakes. The habit of this species is unique in the genus. It has an interesting history; the earliest collections known were made by Rugel from Lake Iamonia, near Tallahassee, in 1845, and were founded by me, unnamed, in the herbarium of the British Museum. Until quite recently, apart from fragments of the type specimen of Nash (described from Lake County in 1896, about 50 years after Rugel collected it), no other specimens existed in European herbaria, and only a few in United States herbaria. During my stay in Florida in 1972 I did not find it in Lake Iamonia, which is now largely silted and quite unsuitable, but I was shown it in the relatively recently man-made Lake Seminole, and found it also in several lakes in the vicinity of Orlando and in White Lake, Bladen County, in N. Carolina.

4. ***U. foliosa*** *L.*

From North America I have seen specimens of this essentially tropical species from N. Carolina, Georgia, Florida, Louisiana, Mississippi and Texas. It seems unlikely that it does not also occur in S. Carolina and Alabama. Elsewhere it is very widespread in C and S America and also in tropical Africa and Madagascar. It grows in shallow to quite deep water in ditches, lakes and swamps. In the past it has been confused, by some North American authors, with *U. macrorhiza*, but the vegetative parts and especially the fruits and seeds are very different. The flattened stolons are unique in the genus.

5. ***U. geminiscapa*** *Benj.*

Endemic in North America, where it occurs in eastern Canada and in the United States from Maine to north-eastern N. Carolina, also extending westwards to Wisconsin, Iowa, Michigan and W. Virginia. It grows (according to Fernald) in pools, ponds and sluggish streams. In the sterile condition this species is not easily distinguished from some forms of *U. macrorhiza*, although the leaf-segments usually bear fewer setae than are generally found in that species and the quadrifid glands inside the traps are quite different. *U. radiata* and *U. inflata* are the only other North American aquatic species in which the chasmogamous corolla has a 3-lobed lower lip, and those two both invariably have a whorl of floats on the peduncle.

6. ***U. gibba*** *L.*

In North America this species is widespread in Canada (Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba and British Columbia) and in the United States it is absent only from Alaska and the great plains and Rocky Mountain states (that is, N. and S. Dakota, Nebraska, Iowa, Montana, Wyoming, Colorado, New Mexico,

Arizona, Utah, Idaho and Nevada). It has also been found, relatively recently, in Hawaii. Elsewhere it is more or less pan-tropical, and is found as a weed in botanic gardens and probably in collections of cultivated carnivorous plants. It grows in a great variety of wet habitats (I have even seen it, in the Everglades, growing as an "epiphyte" on a floating mossy log, some considerable distance above water-level), but does not usually flower in deep water unless supported by a floating mat of living or dead vegetation. It is a very variable species and has formerly, by most North American authors, been treated as two species - *U. gibba* proper, with a short obtuse spur to the corolla, and *U. biflora* Lam., with somewhat larger flowers with a relatively longer, more slender spur. However, many intermediate forms exist, and a study of the species throughout the world, both in the field and the herbarium, induced me to unite these two (and many others) under the earliest name. The relative proportions of the lips of the corolla, the sparse leaf-segments and the distinctive seeds, distinguish this from all other species in the region except the allied *U. striata* and *U. floridana*; for differences from these two, see key. In the sterile condition, which is very commonly found, sometimes suspended in deep water, it may resemble non-flowering plants of *U. minor*, and I have seen the two growing together in Michigan. However, the leaf-segments in that species are usually more numerous and differ from those of *U. gibba* in usually, (but not invariably), having lateral setae on the ultimate segments - those of *U. minor* never do. The two species can always be distinguished with certainty by the very different quadrifid glands inside the traps.

7. ***U. inflata*** *Walter*

Endemic in the United States, where it occurs in the eastern coastal plain states from New Jersey to Texas, extending westwards into Kentucky, Tennessee and Arkansas, with a single recent record from Washington state. It grows in shallow to very deep water in lakes, ponds and ditches. this species has been confused with the similar *U. radiata*, but the two species are quite distinct. When stranded by falling water level it produces a rather puzzling form (it does not seem to flower in this condition), which produces, at the end of stolon branches, distinctive tuber-like organs which are buried in the substrate. This form is easily induced in cultivation, but I was unable to induce it in *U. radiata*.

8. ***U. intermedia*** *Hayne*

This species occurs throughout Canada and in all of the northern states of the USA, southwards to California, Montana, N. Dakota, Iowa, Illinois, Indiana, Ohio, Pennsylvania and Delaware. Elsewhere it occurs throughout the cooler parts of the northern hemisphere. It usually grows in shallow water in acid fens and bogs. Confusion is likely with *U. ochroleuca* but *U. intermedia* can usually be distinguished by the untoothed margins and obtuse apices of the green leaf-segments, which usually bear no traps. The traps are also usually larger, and in fact, probably the largest found in any North American species.

9. ***U. juncea*** *Vahl*

In North America this is confined to the United States eastern coastal plain, from New Jersey to Texas. To the south it extends from the Bahamas, Cuba and Mexico southwards to Brazil. Its distribution is thus quite different from that of the very similar *U. cornuta*. The usual habitat is wet sand or peat or in shallow water in

marshes, bogs and by ponds. The two species may usually be distinguished by the smaller, more numerous and more widely spaced flowers of *U. juncea*. A cleistogamous form, with very small flowers that do not open, is frequently found and has been recognised as a distinct species (*U. virgatula* Barnhart). Intermediate forms, however, often occur, and sometimes both chasmogamous and cleistogamous flowers may be found on the same inflorescence.

10. ***U. macrorhiza*** *Le Conte*

The distribution of this species is of some interest. It occurs throughout Canada and in most of the United States (including Alaska), being absent only in the warmer southeastern coastal plain states, although an occasional sterile specimen has been found in S. Carolina and Florida and it has been found a few times, at high altitude, in the mountains of Mexico. It also occurs on the other side of the Bering Straits in easternmost Soviet Union, and in Mongolia and parts of China. It grows in shallow to deep water in ponds, lakes and wet fens. It has, in the past been confused with the European *U. vulgaris*, and has sometimes been treated as a variety (var. *americana*), or as a subspecies (subsp. *macrorhiza*), although the earliest epithet available in the varietal rank is *robbinsii*. I believe that it is correctly regarded as a distinct species, and seeing it in flower in the field recently in Michigan (with the kind assistance of Don Schnell) reinforced this view. It has also been confused with *U. foliosa*, (for example in Fassett (1940), Muenscher (1944) and in Kondo's key (1973), and, partly at least, in the "Flora of the Carolinas"), but the two species are only very superficially similar and the terete stolons of *U. macrorhiza* will always serve to distinguish them.

11. ***U. minor*** *L.*

This species has a distribution in North America very similar to that of *U. intermedia*, and the two species often grow together. Elsewhere it occurs throughout the cooler part of the northern hemisphere and is also found in a few places further south, for example in the mountains of Burma and New Guinea. It grows in shallow, usually acid, water in bogs and fens. When in flower this is a very distinct species, the very short spur of the corolla distinguishing it from all other North American species but *U. olivacea*, but that species has very much smaller white flowers and no free-ending leaf-segments.

12. ***U. ochroleuca*** *Hartm.*

This species has only relatively recently been much noticed as a North American plant, although it was collected, and described as *U. occidentalis* A. Gray in 1883. So far it has been recorded from a number of Canadian provinces and from several northern states in the USA (Alaska, Washington, Oregon, Colorado, Ohio, Illinois, Michigan and Minnesota), and probably occurs in others, and should be looked for. Elsewhere it occurs in Europe and temperate Asia, where it is also probably under-recorded. It is very similar to *U. intermedia* and grows in similar habitats, (although possibly not with it). Unlike that species, which reproduces sexually, it is a vegetative apomict; that is, it never produces fruit, and reproduction and dispersal is by vegetative fragments or by turions. When in flower it has a shorter spur than in *U. intermedia*, but the toothed margins of the green leaf-segments, coupled with the presence of some traps on the latter, furnish the best characters for distinguishing the two species when not in flower. If all else fails, the quadrifid glands inside the traps always have diverging, not parallel, pairs of arms.

13. ***U. olivacea*** *Wright ex Griseb.*

In North America this is known only from the eastern coastal plain states of New Jersey, N. and S. Carolina, Georgia and Florida, although it is easily overlooked, especially when not in flower, and probably occurs in other eastern states. Elsewhere it extends from Cuba to Brazil and Bolivia. It grows in still or slowly flowing water in ponds, lakes, ditches and streams, often intertwined with other plants, including other *Utricularia* species This is one of the smallest of *Utricularia* species, and one of the few aquatic species which have not free-ending leaf-segments, the thread-like stolons bearing only shortly-stalked traps.

14. ***U. purpurea*** *Walt.*

This very distinct species has a wide distribution in eastern North America from eastern Canada (Ontario, Quebec, New Brunswick and Nova Scotia), through all of the eastern coastal plain states from Maine to Texas and extending westwards into Michigan, Illinois and Indiana. Elsewhere it is found from the Bahamas and Cuba to Costa Rica and is replaced by a similar species in S. America. It grows in lakes and pools, ditches and slow-flowing streams. Not likely to be confused with any other species in North America, in any condition, the verticillate leaf-segments and the shape of the corolla being diagnostic.

15. ***U. radiata*** *Small*

This species has a somewhat wider distribution in the eastern states than the similar *U. inflata*, occurring from Nova Scotia in Canada and from Maine through all of the coastal plain states to Louisiana, extending westwards into Indiana, Tennessee and Arkansas. It grows in similar habitats to *U. inflata*, and sometimes, as I have seen in Florida, the two may be found growing together. The shape of the floats and bract provide the best characters for distinguishing the two species.

16. ***U. resupinata*** *Greene ex Bigelow*

This species is found in eastern Canada (Ontario, Quebec, New Brunswick and Nova Scotia) and eastern USA from Maine to Delaware, apparently absent from Virginia and, even more inexplicably, the Carolinas, reappearing in Georgia and Florida, with westward extensions to Michigan, Indiana and Wisconsin. Elsewhere it has been recorded from Cuba, Belize and Nicaragua. It grows in shallow water or in wet sand or mud at the margins of pools. It would be of interest to know if a clone from, say, Florida, would be hardy in the cold winters of the north. It may pass the winter as a seed in the cooler parts of its range, and thus behave as an annual, although it may be perennial in the warmer south. A possible explanation of the distribution gap is that there is not a continuous cline but that two forms have evolved in the two regions, neither of which, for some reason, occurring in the intermediate area. It may also be possible that no suitable habitats are to be found in this area, although I have seen what appeared to me to be likely terrain in N. Carolina. At least in the northern part of its range, it is said to flower only under simultaneous conditions of low water level and higher than normal temperatures. The septate, subulate leaves are unique in the genus, and make certain identification of sterile material possible. The curious tubular bract is shared only with the other species in the section, which occurs in South America, and has quite different leaves.

17. ***U. simulans*** *Pilger*

This species has been collected in a number of localities in southern Florida (I have seen specimens form 10 counties), where it is (or was), said to grow in damp sandy flats. Elsewhere it has a wide distribution in Central and South America from Cuba to Paraguay, and also in various parts of tropical Africa. Don Schnell has recently located it in Florida, although many or perhaps most of the localities as recorded on herbarium specimens have now been destroyed by urban development and drainage. The fimbriate calyx lobes and bracts are unique among north American species, and although it is not likely to be noticed when not flowering, the traps (which measure only 0.2-0.3 mm long) are similarly unique.

18. ***U. striata*** *Le Conte ex Torrey*

Endemic in the United States, where it is restricted to the eastern coastal plain from Massachusetts to Texas and Oklahoma. It grows in shallow water in bogs and marshes, or sometimes in deeper water, supported by floating mats of other vegetation. This species (which goes under the name of *U. fibrosa* Walt. in most north American floristic works) is quite similar to the larger forms of *U. gibba*, but in the field at least it is distinguished by the two very different types of leaves, which are invariably present, although they are not always obvious in badly prepared herbarium specimens. It is probably more closely allied to *U. floridana*, which grows in deeper water and has a flexuose submerged peduncle and much longer leaf-segments. Plants which appear to be in some ways intermediate, which I observed in SE N. Carolina, should be investigated.

19. ***U. subulata*** *L.*

This species is recorded form Canada (Nova Scotia) and all the coastal plain states from Massachusetts to Texas and also Tennessee and Arkansas. Elsewhere it is almost pan-tropical, and I have personally collected it in America (both north and south), Africa and Australia. It grows in wet sand in a variety of open vegetation types—roadside borrow-pits are often quite yellow with it in NW Florida. The peltate bracts distinguish it from all other North American species. *U. subulata* is a common weed of glasshouses in which carnivorous plants are cultivated. It commonly occurs in such situations (and in the field) as a cleistogamous form, with the whole plant, and especially the corolla, much reduced in size and forming fruits and seeds without opening.

The Genus *Genlisea*

By Peter Taylor

Introduction

The genus *Genlisea* currently comprises 19 species, 8 of which occur in tropical and South Africa (one of these occurring also in Madagascar), the remaining 11 beir found in Central and South America. None of the species occurs in both continents. It differs from *Utricularia* in having a 5- (not 2-) lobed calyx and in its traps, which are very different. Unlike *Utricularia*, the trapping mechanism is passive, and works on the principle of a lobster-pot; that is, the prey can enter the trap but is prevented from leaving by inward-pointing bristles, and once inside can move only towards the

"digestion-chamber". A lobster-pot, of course, contains some bait, but what causes the prey to approach and enter the *Genlisea* trap does not seem to have been established. In *Utricularia* the traps are very diverse in their morphology, but in *Genlisea* they appear to be rather uniform in shape, and although they vary considerably in size both between and within the species (or even sometimes the individual), they do not, at present, appear to provide useful characters for identification, although an examination of more complete material of all the species may yet reveal constant specific differences. The genus has been divided, by Elza Fromm-Trinta, into two sections, based chiefly on the manner in which the capsule splits to shed its seeds. In section **Genlisea**, which occurs in both Africa and America, the fruit is unique among the flowering plants in that it is circumscissile, but splits (comparing the capsule to the globe) not only at the equator, but also at two further latitudes between the equator and the north pole. Stopp (1958) figures this, and also a capsule which is splitting in a spiral manner, but I have not personally observed this. In section **Tayloria**, which occurs only in Brazil, the capsule splits into longitudinal valves. The three species which comprise this section (*G. violacea, G. uncinata* and *G. lobata*) differ from the American species in section **Genlisea** in having the fruiting pedicels reflexed or recurved, but in Africa three species in the latter section (*G. margaretae, G. glandulosissima* and *G. pallida*) also have recurved fruiting pedicels.

I have personally observed only two species in the field (in Africa), *G. subglabra* which grew in permanently wet bogs with a peaty substrate, and flowered just before and during the early part of the wet season, and *G. margaretae*, which grew in a woodland clearing in a wet valley bottom on pure sand. It vegetated all through the wet season and came into flower in the early part of the dry season. In the latter species some of the traps descended to a depth of about 20 cm below the surface, and were very difficult to collect intact.

The genus is a very natural group; that is, the species are all very similar to each other, and the range of taxonomic characters available for distinguishing them is small. The traps have already been dismissed as being of little use, and the only other vegetative characters available are habit and leaf shape. In habit they are, in general, not at all diverse, most having a very short vertical stem which springs a more or less dense rosette of leaves. Only one species differs in having a more or less elongated, horizontal stem. As to the leaves, they are mostly spathulate, but a few are strap-shaped, although in one species both types have been observed. They vary somewhat in size, and in some species appear to be invariably small, or large, while in others there seems to be a wide range within the species. There is also variation between species in the number of leaves per rosette, although, again, this appears to vary considerably within a single species or even population. We are thus left with characters derived from the inflorescence. Corolla color is mostly either yellow or some shade of violet or mauve, a few are white or cream. Within most species the color appears to be constant, but one, normally violet-flowered African species, has a bright and a greenish yellow flowered form (there are no normally yellow-flowered species in Africa), and also an albino, white-flowered form. It is, of course, possible that albino forms of other violet-flowered species may occur, as they are known to do in several violet or pink flowered *Utricularia* species. There is considerable diversity in the size and shape of the corolla and its various parts; the spur may be longer or shorter than the lower lip, and its apex obtuse or acute, and the shape and relative proportions of the two lips varies considerably between different species. Perhaps the most important character, of which much use is made in the key, is the indumentum, that is the hairs and glands which occur on most of the various parts of the inflorescence. A few are glabrous or almost so, while others bear either simple hairs or gland-tipped hairs (sometimes termed stipitate glands), or a mixture of both, and close attention to the distribution

and nature of the indumentum is essential for the determination of most species, and in most cases can be observed with a hand lens. As in *Utricularia*, there appear to be differences in the seeds and pollen which could be of use in distinguishing species, but as a microscope is necessary, and not all species have been studied, such characters have not been used in what is intended to be a practical key.

The habitats in which *Genlisea* species are found are similar to those where terrestrial *Utricularia* species grow, and the two genera are often found together. As with the latter genus, some appear to prefer wetter habitats than others, but water is probably essential underground around the traps for them to function. All of the species, except perhaps for *G. repens*, which may spread, short range by its creeping stem, appear to be propagated and dispersed only by seed, although it may be possible to propagate by leaf-cuttings in cultivation, as with some *Utricularia* species. The flowers appear to be adapted to insect pollination, but it is likely that they may be autogamous (self pollinating) as in *Utricularia*.

The function of the traps has been studied, but rather less than most other carnivorous plants, possibly because of the lack of suitable material.

No key to the whole genus has been published hitherto, and I hope that the one that follows will serve until Elza Fromm-Trinta completes the monograph of the genus on which she has been working for some years.

Key to Species of *Genlisea*

1. Corolla bright or greenish yellow.

2. Spur of corolla shorter than the lower lip (Am) 14. *roraimensis*

2. Spur of corolla longer than, or at least as long as, the lower lip.

3. Corolla 15-20 mm long; raceme axis short, the flowers more or less congested; robust plant, up to 40 cm tall; upper part of inflorescence, including flowers, densely covered with gland-tipped hairs (Am). 3. *aurea*

3. Corolla less than 12 mm long; raceme axis elongate, the flowers more or less widely spaced; small plant, usually less than 25 cm tall; upper part of inflorescence glabrous or almost so, or with simple hairs, or gland-tipped hairs, or a mixture of both.

4. Upper part of inflorescence sparsely to quite densely covered with gland-tipped hairs only; spur not narrowly conical.

5. Corolla 6-8 mm long, with spur inflated, cylindrical, with apex obtuse; gland-tipped hairs few; corolla, including spur, longer than wide (Am). 4. *filiformis*

5. Corolla 10-12 mm long, with spur broad in the proximal half, tapering to a narrowly cylindrical or obtusely conical distal half; gland-tipped hairs usually numerous; corolla, including spur, about as long as wide (Afr). 1. *africana*

4. Upper part of inflorescence with a few simple hairs, or with a mixture of short simple hairs and longer gland-tipped hairs; spur narrowly conical.

6. Upper part of inflorescence covered with a mixture of simple hairs and longer, gland-tipped hairs; stem very short, erect (Am). 12. *pygmaea*

6. Upper part of inflorescence with a few simple hairs only; stem elongated, prostrate. 13. *repens*

1. Corolla mauve, violet, cream or (abnormally) white.

7. Pedicels reflexing or recurving after flowering.

8. Upper lip of corolla with apex distinctly 2-lobed.

9. Lobes of lower lip of corolla with apex rounded or truncate; corolla violet (Am). 19. *violacea*

9. Lobes of lower lip of corolla with apex emarginate; corolla white, with a violet spur (Am). 9. *lobata*

8. Upper lip of corolla with apex rounded, not lobed.

10. Spur of corolla hooked, with the distal half curving forwards and upwards (Am). 18. *uncinata*

10. Spur of corolla not hooked, more or less straight.

11. Corolla cream; receme with flowers fewer than 6, not congested; peduncle with few, inconspicuous scales (Afr). 11. *pallida*

11. Corolla violet or mauve; raceme with more than 10 flowers, congested; peduncle with numerous, conspicuous scales.

12. Inflorescence 6-14 cm tall, densely covered throughout with gland-tipped hairs (Afr). 6. *glandulosissima*

12. Inflorescence 20-60 cm tall, the upper part densely covered with gland-tipped hairs, the lower part glabrous or only sparsely glandular (Afr). 10. *margaretae*

7. Pedicels not reflexing or recurving after flowering.

13. Inflorescence completely glabrous (Am). 5. *glabra*

13. Inflorescence, or at least the ovary and capsule, with a least some simple or gland-tipped hairs, or both.

14. Leaves strap-shaped up to 12 cm long and 1 cm wide.

15. Inflorescence, excluding ovary and capsule, glabrous or with a few scattered simple hairs.

16. Ovary and capsule with short gland-tipped hairs (Afr). 2. *angolensis*

16. Ovary and capsule with simple hairs (Am). 7. *guianensis*

15. Inflorescence, at least the upper part, densely covered with a mixture of simple and gland-tipped hairs (Am). 15. *sanariapoana*

14. Leaves obovate-spathulate, not more than 5 cm long.

17. Inflorescence, including ovary and fruit, with simple hairs only.

18. Distal half of ovary and capsule densely hispid. 8. *hispidula*

18. Distal half of ovary with a few hairs only. 17. *subglabra*

17. Inflorescence with gland-tipped hairs, sometimes mixed with simple hairs.

19. Spur of corolla about twice as long as the lower lip, and the corolla, including spur, about three times as long as wide (Am). 15. *sanariapoana*

19. Spur of corolla less than one and half times as long as the lower lip, and the corolla, including spur, scarcely longer than wide.

20. Upper part of inflorescence more or less densely covered with a mixture of gland-tipped hairs and shorter, simple hairs. 1. *stapfii*

20. Upper part of inflorescence sparsely to more or less densely covered with gland-tipped hairs only; corolla violet or rarely white. 16. *africana*

Notes on Distribution of *Genlisea*

1. ***G. africana*** *Oliver*

C & S tropical Africa (SE Zaïre, Angola, Zimbabwe & Zambia). A medium sized to large species with relatively large flowers. The corolla is usually deep violet, with a rare bright or greenish yellow form which may grow with typical plants and intermediate forms, or sometimes as pure populations. an albino form with a white corolla is also recorded. Very similar to the largely W. African *G. stapfii*, which tends to be smaller and differs in its indumentum.

2. ***G. angolensis*** *Good*

C & S tropical Africa (Angola and SE Zaïre). A rare, relatively large species, apparently of wet habitats, which differs from all other African ones in its relatively long, strap-shaped leaves (for differences from American species with similar leaves see key).

3. ***G. aurea*** *St. Hil.*

Tropical America (Brazil, from Goias to Sta. Catarina). The largest and most showy of the yellow-flowered species, not excusably confused with any other. The corolla can be up to 2 cm long, but is often somewhat smaller.

4. ***G. filiformis*** *St. Hil.*

Tropical America (Belize, Cuba, Colombia, Venezuela, Guyana and Brazil (from Amazonas to São Paulo)). The only species with small yellow flowers that has an obtuse, rather than an acute, spur-apex, and usually rather sparse, long gland-tipped hairs, without any admixture of simple hairs.

5. ***G. glabra*** *P. Taylor*

Venezuela only, where it is known from Apàcara-tepui, Aprada-tepui and Torono-tepui. The only species with the combination of small violet flowers and a completely glabrous inflorescence.

6. ***G. glandulosissima*** *R. E. Fries*

S. tropical Africa (Zambia only). A small species with mauve or violet flowers. It is similar to *G. margaretae*, with which it is known to hybridize, but has a shorter inflorescence which is densely glandular throughout. The pedicels of both species are strongly recurved in fruit.

7. ***G. guianensis*** *N. E. Brown*

Tropical America (Guyana, Venezuela (Bolivar) and Brazil (Bahia, Mato Grosso, Goiás)). A large, violet-flowered species of wet habitats. It is distinguished from the African *G. angolensis*, which has similar strap-shaped leaves, by the absence of gland-tipped hairs on its ovary and capsule. It is also somewhat similar to *G. sanariapoana*, which may also have strap-shaped leaves, but has a densely glandular, rather than the very sparsely glandular or hairy or almost glabrous inflorescence of *G. guianensis*.

8. ***G. hispidula*** *Stapf*

Tropical Africa (Nigeria, Cameroun, Central African Republic, Kenya, Tanzania, Zambia, Zimbabwe, Malawi and Mozambique) and S. Africa. A medium sized eglandular species with mauve or pink flowers. It is very similar to *G. subglabra*, but is much more widespread. It differs only in having more numerous hairs on the ovary and capsule.

9. ***G. lobata*** *Fromm-Trinta*

At present known from a single collection (which I have not seen) from Brazil (Minas Gerais). A small, delicate species in section Tayloria, which differs from *G. violacea* in having the lobes of both upper and lower lips of the corolla distinctly emarginate. The corolla also differs in being white with a violet spur. The pedicels are sharply reflexed in fruit.

10. ***G. margaretae*** *Hutchinson*

Tropical Africa (Tanzania and Zambia) and Madagascar. An uncommon, relatively tall, slender species with violet or mauve flowers and recurved fruiting pedicels.

11. ***G. pallida*** *Fromm-Trinta and P. Taylor*

Tropical Africa (Angola and Zambia). The only African species in which the corolla is not normally violet or mauve but is apparently always cream, and the fruiting pedicels are recurved.

12. ***G. pygmaea*** *St. Hil.*

Tropical America (Colombia, Trinidad, Venezuela, Guyana and Brazil). A small yellow-flowered species with an acute spur and densely glandular inflorescence.

13. ***G. repens*** *Benj.*

Tropical America (Venezuela, Guyana, Brazil and Paraguay). A small, yellow-flowered almost glabrous species distinguished by its relatively long subterranean stem, which bears leaves throughout its length. All of the species with similar flowers have a very short, erect stem which bears a more or less dense rosette of leaves.

14. ***G. roraimensis*** *N. E. Brown*

Tropical America (Venezuela and Guyana, where it is confined to relatively high altitudes on the "tepuis"). Differs from the other small, yellow-flowered species in having the spur shorter than the lower lip of the corolla.

15. ***G. sanariapoana*** *Steyermark*

Venezuela only, where it is known from a number of localities in Edo Bolivar and Terr. Fed. Amazonas. Very like *G. guianensis* and appears to sometimes have similar strap-shaped leaves, at least when growing in wetter habitats, plants from drier habitats having spathulate leaves. A fairly large, robust, densely glandular species with violet flowers.

16. ***G. stapfii*** *A. Chev.*

Tropical Africa, from Guinea-Bissau to Cameroun, Central African Republic, Gabon and, Zaïre and Angola. A medium sized violet-flowered species, very similar to *G. africana* and replacing it in western Africa. It differs mainly in indumentum.

17. ***G. subglabra*** *Stapf*

Tropical Africa, Zaïre, Rwanda-Burundi, Tanzania, Malawi and Zambia. A medium sized species with pink or mauve flowers, very similar to *G. hispidula* but with a more restricted distribution and differing from it in indumentum.

18. ***G. uncinata*** *P. Taylor and Fromm-Trinta*

Known only from Brazil (Bahia). A very distinct large, violet-flowered species in section Tayloria, differing from the other two species in the section in being much larger and more robust, in its hooked spur-apex and its papillose seeds. The fruiting pedicels are recurved rather than reflexed.

19. ***G. violacea*** *St. Hil.*

Known only from Brazil (Minas Gerais, Expirito Santo and São Paulo). A small, violet-flowered species in section Tayloria. The lower lip of the corolla is deeply 3-lobed, the lobes being cuneate in shape (wedge-shaped, narrowed to the base) and the spur is scarcely half as long and either narrowly cylindrical or sometimes club-shaped, that is, slightly swollen at the apex.

The Genus *Genlisea St. Hil.* An Annoted Bibliography

By Peter Taylor, 1990

The names following the entries in parentheses are those dealt with in the work (if not mentioned in the title), in **bold** if new species or new combinations, otherwise in *italic*. The names are those used by the author of the work, and not necessarily those which are currently accepted by myself or Elza Fromm-Trinta (e.g., *G. oxycentron* P. Taylor (1955) is now considered to be a synonym of *G. pygmaea* St. Hil. (1833) - see check-list), and some may be misidentifications.

Agnew, A., Upland Kenya Wildflowers: 569 (1974). Oxford. (*hispidula*).

Angely, J., Flora Analitica e Fitogeografica do Estado de São Paulo 5: 943 (1970). São Paulo. (*biloba, repens*).

Barnhart, J. H., Segregation of genera in Lentibulariaceae. Mem. New York Bot. Gard. 6: 48, fig. 5 (1916). (*filiformis*).

_____ in Gleason, H.A., The Tyler Duida Expedition. Bull. Torrey Bot. Club 58: 469 (1931). (*roraimensis*).

Beauverd, G., Plantae Damazianae Brasiliensis. Bull. Herb. Boiss. II, 7: 702 (1907). (*ornata*).

Benjamin, L. in Martius, C. P. F. de, Flora Brasiliensis 10: 252, tab. 21, fig. II (June 1847). Munich. (*aurea,* **biloba,** *filiformis, minor,* **ornata,** *pygmaea,* **reflexa, repens,** *violacea*).

_____ Neu Gattungen und Arten der Utricularieen nebst einer neuen Eintheilung der Gattung Utricularia. Linnaea 20: 316 (July 1847). (*biloba, ornata, reflexa, repens*).

Bentham, G, & Hooker, J. D., Genera Plantarum 2: 988 (1876). London.

Berhaut, J., Flore Illustrée du Sénégal 4: 244, fig. (1975). Dakar. (*africana*).

Bosser, J., Sur deux nouvelles Lentibulariacées de Madagascar. Nat. Malgache 10: 21-23, fig. 1 (1959). (**recurva**).

Brown, N. E., **Genlisea guianensis** N. E. Brown, sp. nov. Hooker's Icones Platarum IV, 7: tab. 2629 (1900).

_____ Report on two botanical collections made by Messrs. F. V. McConnell & J. J. Quelch at Mount Roraima in (sic) British Guiana. Trans. Linn. Soc. 6: 56, tab. 10, fig. 12-16 (1901). (*guianensis*, **roraimensis**).

Chevalier, A., Novitates Florae Africanae. Bull. Soc. Bot. France, Mém. 8: 188 (1912). (**stapfii**).

_____ Expl. Bot. 1: 484 (1920). Paris. (*africana, stapfii*).

Chodat, R. & Hassler, E., Plantae Hasslerianae. Bull. Herb. Boissier II 3: 919 (1903). (*filiformis*).

Darwin, C. R., Insectivorous Plants: 446-452, figs. 29 & 30 (1876).

De Candolle, A. in De Candolle, A. P., Prodromus Systematis Naturalis Regni Vegetabilis 8: 25-26 (1844). Paris. (*aurea, filiformis, minor, pygmaea, violacea*).

Decker, J. S., Aspectos Biologicos de Flora Brasiliera: 315 (1877). Sao Leopoldo.

Fernández-Pérez, A., Plantas Insectivoras, I: Lentibulariaceas de Colombia y Peru. Caldasia 9(41): 73-79, figs. 25 & 26 (1964). (*anfractuosa, filiformis, sp. cfr. pygmaea*).

Fries, R. E., Wiss. Ergebn. Schwed. Rhod.-Kongo-Exped. 1911-12: 301, fig. 36 (1916). Stockholm. (*africana, africana* forma **pallida, glandulosissima**).

Fromm-Trinta, Elza, **Tayloria** Fromm-Trinta - Nova Seção do genero Genlisea St. Hi. Bol. Mus. nac. Rio de Janeiro, n. s. Bot. 44: 1-4, tabs. 1 & 2 (1977).

_____ Revisao das especies do genero Genlisea St. Hil. das regioes sudeste e sul do Brasil. Dissertacao de Mestrado apresentada a Coordenacao do Curso de Pos-Graduacao em Botanica da UFRJ. pp. 104+iii, figs. 1-35 (1978). (*aurea, filiformis, pygmaea, repens, violacea*).

_____ Revisao do gênero Genlisea St. Hil. das regioes sudeste e sul do Brasil. Rodriguesia 31: 17-139, figs. 1-35 (1979). (*aurea, filiformis, pygmaea, repens, violacea*).

_____ Revisao do gênero Genlisea St. Hil. no Brasil. Bol. Mus. nac. Rio de Janeiro, n. s. Bot. 61: 1-21, figs. 1-7 (1981). (*aurea, filiformis, guianensis, pygmaea, repens, roraimensis, violacea*).

_____ Genliseas Americanas. Sellowia No. 36: 55-62, figs. 1 & 2 (1984). (*aurea, filiformis, glabra, guianensis, pygmaea, repens, roraimensis, sanariapoana, uncinata, violacea*).

_____ **Genlisea lobata** Fromm-Trinta - uma nova especie para o genero Genlisea St. Hil. sect. Tayloria. Bradea 5: 152-155, fig. (1985).

_____ & Taylor, P. **Genlisea pallida** Fromm-Trinta & Taylor, P. - uma nova espécie para o gênero Genlisea St. Hil. Bradea 4: 176-179, fig. (1985).

Gibson, D. N. Flora of Guatemala X No. 4. Fieldiana, Bot. 24: 315-316, fig. 68 (1974). (*filiformis*).

Glaziou, A. F. M., Liste des plantes du Bresil Central. Bull. Soc. Bot. France, Mém. 3: 512 (1908). (*ornata, violacea*).

Goebel, K., Pflanzenbiologische Schilderungen 2: 121-127, tabs. 15 & 16 (1891). Marburg. (*ornata*).

_____ Zur Biologie von Genlisea. Flora 77: 208-212, fig. (1893). (*violacea*).

_____ Organographie der Pflanzen: 444, fig. 298 (1898-1901). Jena. (*violacea*).

_____ Organographie der Pflanzen, ed. 2; 2, 3, 117, 118, 1388, figs. 1, 2, 116, 1327 (1913-1928). Jena. (*ornata, violacea*).

_____ Organographie der Pflanzen, English Edition 2: 234, 236, 237, figs. 169, 265, 338. (1905). Oxford. (*violacea*).

Good, R. D'O. New Tropical African Lentibulariaceae. Journ. Bot. 2: 165 (1924). (**angolensis**).

Hiern, W. P., Cat. Afr. pl. Welw.: 789 (1900). London. (*africana*).

Hutchinson, J. & Dalziel, M. D., Flora of West Tropical Africa 2: 236 (1931). (*africana*).

Hutchinson, J., A Botanist in S. Africa: 528-529 (1946). London. (**subviridis**, **margaretae**).

_____ The Families of Flowering Plants, Ed. 2: 493 (1959). Oxford.

Hoehne, F. C., Plantas Aquaticas: 149-150, tab. 78 (1955). Sao Paulo (*ornata*).

Juniper, B. E., et al, The Carnivorous Plants: 9, 18, 22, 37, 45, 54, 56, 71, 72, 86, 126, 150, 153, 156, 285, figs. 4,17A-C (1989). London.

Kamienski, F., in Engler, A. & Prantl, K. A. E., Die naturlichen Pflanzenfamilien IV, 3b: 118-119, fig. 50, preprint (1891), & Lieferung 83 (1893). Leipzig. (*ornata*).

Komiya, S., Systematic Studies on the Lentibulariaceae. Dissertation, Department of Biology, Nippon Dental College, Tokoyo: 20, 32 (1972).

_____ New Subdivision of the Lentibulariaceae. Journ. Jap. Bot. 48: 148 (1973).

Kuhlmann, J. G., Notas Biologicas sobre Lentibulariaceas. Anais de primeira Reuiniao Sul-Americana de Botanica 3: 314 (1940).

Lloyd, F. E., The Carnivorous Plants. Trans. Roy. Soc. Canada 27: 25-30, figs. 6-8, tabs. 6 & 7 (1933).

_____ The Carnivorous Plants: 90-94, tabs. 11 & 12 (1942). Waltham, Mass. (Dover reprint, (1976). New York).

Luetzelburg, P. von, Estudo Botanico Nordeste do Brazil. Publ. Inspect. Fed. de Obras Contra as Seccas 57, IA 3: 223 (1926). (*ornata, ornata* var. **gracilis**, nom. nud., *filiformis*,, **luetzelburgii**, nom. nud., *pusilla, repens*).

Léon, H. & Alain, H., Flora de Cuba 4. Contr. Ocas. Mus. Hist. Nat. Colegio de la Salle 16: 475 (1957). (*luteoviridis*).

Lemée, A., Flore de la Guyane Francaise: 466 (1953). Paris. (*filiformis*).

Melchior, H., Syllabus Pflanzenfamilien, ed. 12, 2: 466 (1964). Berlin.

Merl, E., Beitrage zur Kenntnis der Utricularien und Genliseen. Flora 108: 128-133, 186, 178-181, 199, figs. 1-3, 28, 29 (1915). (*cylindrica, filiformis, glandulosissima, ornata, violacea*).

Metcalf, C. R. & Chalk, L., Anatomy of the Dicotyledons 2: 992, fig. 231 (1950). Oxford.

Oliver, D., On the Lentibularieae collected in Angola by Dr. Welwitsch, with an Enumeration of the African Species. J. Linn soc. Bot. 9: 145-146 (1865). (**africana**).

_____ Contribution à l'étude de la flore de l'Afrique occidentale francaise: Lentibulariées. Bull. Soc. Bot. France 61: 20-21 (1914). (*africana, stapfii.*).

Phillips, E. P., The Genera of South African Plants, Ed. 2: 696 (1951). (*hispidula*).

Ross, J. H., Flora of Natal: 320 (1973). (*hispidula*).

St. Hilaire, A. de, Voyage dans le District du Diamans du Brasil 2: 428-432 (1833). Paris. (**aurea, filiformis, minor, pygmaea, violacea**).

_____ & Girard, F. de, Monographie des Primulaceés et des Lentibularieés du Brésil Méridional, Compt. Rend. Hebd. Séances Acad. Sci 7: 870 (1838). (*aurea, filiformis, minor, pygmaea, violacea*).

____ & ____ Monographie des Primulaceés et des Lentibularieés due Brésil méridional et de la république Argentine. Ann. Sci. Nat. II, 11: 165-166, tab. 5 (1839). (*aurea, filiformis, minor, pygmaea, violacea*). (Also published again in Mém. Soc. Roy. Scri. d'Orleans 2: 43-46, tab. (1840)).

Solereder, H., Systematische Anatomie der Dicotoledonen: 669-671, fig. 137 (1899)). Stuttgart.

Standley, P., Flora of British Honduras. Publ. Field Mus., Bot. 12: 366 (1936). (*luteoviridis*).

Stepf, O. in Dyer, W. T., Flora Capensis 4: 436-437 (1904). London. (**hispidula**).

_____ in Dyer, W. T., Flora of Tropical Africa 4: 497-499, 575 (1905). London. (*africana, hispidula*, **subglabra**).

Steyermark, J. A. in Maguire, B., et al, Guiana Plants. Bull. Torrey Bot. Club 75: 657 (1948). (**nigrocaulis**).

_____ Botanical Exploration in Veneauela III. Fieldiana, Bot. 28: 534-535 (1953). (**esmeraldae, sanariapoana**).

_____ Botanical Exploration in Venezuela IV. Fieldiana, Bot. 28: 1095 (1957). (*roraimensis*).

Stopp, K., Notiz über die Dehiszenzweise der Kapselfrüchte von *Genlisea hispidula* Stapf. Beiträge zur Biologie der Pflanzen 34: 401-403, fig. 1 (1958).

Sylvén N., Die Genliseen and Utricularien des Regnell'schen Herbariums. Arkiv För Botanik 8: 2-6, tab. 1, figs. 1-6, tab. 3, figs. 1-4 (1908). (**cylindrica**, *filiformis, ornata, violacea*).

P. Taylor in Flora of Trinidad and Tobago 2: 288-290 (1955). Port of Sprin. (**oxycentron**).

_____ in Hepper, F. N., Flora of West Tropical Africa, ed. 2, 2: 375, fig. 291A (1963). (*africana, hispidula*).

_____ in Steyermark, J. A., Flora del Auyan-tepui. Acta Botanica Venezuelica 2: 324 (1967). (*guianensis*).

_____ in Maguire, B. et al, Botany of the Guayana Highland VII. Mem. New York Bot. Gard. 17: 202-206, fig. 26 (1967). (*filiformis*, **glabra**, *guianensis, pygmaea, repens, roraimensis, sanariapoana*).

_____ in Bamps et al., Flore d'Afrique Centrale, Lentib.: 53-60, tabs 16 & 17 (1972). (*angolensis, africana* subsp. **africana**, *africana* subsp. **stapfii**, *hispidula* subsp. *subglabra*).

_____ A new combination in Genlisea. Kew Bull. 26: 444 (1972). (*hispidula* subsp. subglabra).

_____ in Polhill, R. M., Flora of Tropical East Africa, Lentib.: 23, fig. 3 (1973). (*hispidula* subsp. *hispidula, hispidula* subsp. *subglabra, margaretae*).

_____ in Reitz, R., Flora Ilustrada Catarinense, Lentib.: 4-7 (1980). (*aurea, repens*).

_____ in Launert, E., Flora Zambesiaca 8: 38-42, tab. 7 (1988). (*africana, hispidula, glandulosissima, margaretae, pallida, subglabra*).

_____ & Fromm-Trinta, Elza, Una nova espécie para o genero Genlisea St. Hil. sect. Tayloria: **Genlisea uncinata** P. Taylor & Fromm-Trinta. Bradea 3: 365-368, fig. (1983).

Tutin, T., New Species from British Guiana. J. Bot. 72: 309-312, figs. 1 & 2 (1934). (**pulchella, anfractuosa**).

Warming, E., Symbolae ad floram Brasiliae centralis cognoscendam. Vidensk. Medd. Kjöb. 1: 11-12, tab. 2, figs. 18-21 (1875). (*ornata*, **pusilla**).

_____ Contribution a la connaisance des Lentibulariaceae. Vidensk. Medd. Kjöb. 1: 33, tabs. 5 & 61 (1875). (*ornata*).

Wright, C., in Sauvalle, A. H. R., Anal. Acad. Ci. Habana 6: 314 (1869). **luteoviridis**. (reprinted as Fl. Cubana: 90 (1873). Havana).

GLOSSARY

apex acute, when the inculuded angle at the tip of a leaf, bract, etc. is less than a right angle, or, more loosely, sharp (fig. 63).

apex obtuse, when the included angle at the tip of a leaf, bract, etc. is greater than a right angle, or, more loosely, blunt (fig. 65).

auriculate, lobed at the base, like an ear (fig. 66).

basifixed, an organ (usually a bract or scale) which is attached at its base (fig. 17).

basisolute, an organ (usually a bract or scale) which is attached at a point above its base. Sometimes called *medifixed* (fig. 36).

bract, a reduced, leaf-like organ which subtends a pedicel (fig. 19).

chasmogamous, fertilization taking place when the flower is open.

circumscissile, of a capsule which splits or is *dehiscent* around the circumference (fig. 5, 29).

cleistogamous, fertilization taking place within unopened flowers.

connate, joined together, united (fig. 45).

densely hispid, covered with closely set stiff hairs.

denticulate, bearing small or minute teeth at the margin (fig. 76).

emarginate, notched, usually at the apex (fig. 7, upper lip of corolla).

fimbriate, with the margin bordered with long, slender teeth (fig. 42).

flexuous, bent alternately in opposite directions, zig-zag.

glabrous, smooth, without any kind of hairs.

indehiscent, a fruit which does not open by regular lines or valves but ruptures in an irregular manner, or rots away to release the seeds.

lenticular, shaped like a lentil, lens-shaped.

obovate-spathulate, spoon-shaped, with the apical expanded part egg-shaped, but with the widest end nearest the apex (fig. 44).

pedicels recurving, pedicels that are curved downwards after flowering (fig. 68).

pedicels reflexing, pedicels that are abruptly bent downwards after flowering.

peltate, an organ attached at the middle of its lower surface, like the cap of a mushroom (fig. 37).

raceme, an inflorescence with a more or less lengthened axis and equally pedicellate flowers (fig. 14, R).

saccate, bag-shaped; in reference to a spur implies that it is relatively broad in relation to its length, even shorter than wide, and with a blunt apex (fig. 75, Sp.).

scales, bracts on the peduncle, below the raceme, which do not subtend flowers (fig. 14, Sc).

setiform, bristle-like.

spathulate, spoon-shaped.

subsaccate, bag-shaped, like *saccate*, but somewhat longer in relation to its width; intermediate between *saccate* and the normal, more or less elongated spur (fig. 59).

subulate, awl-shaped, narrowly cylindrical with a sharp point.

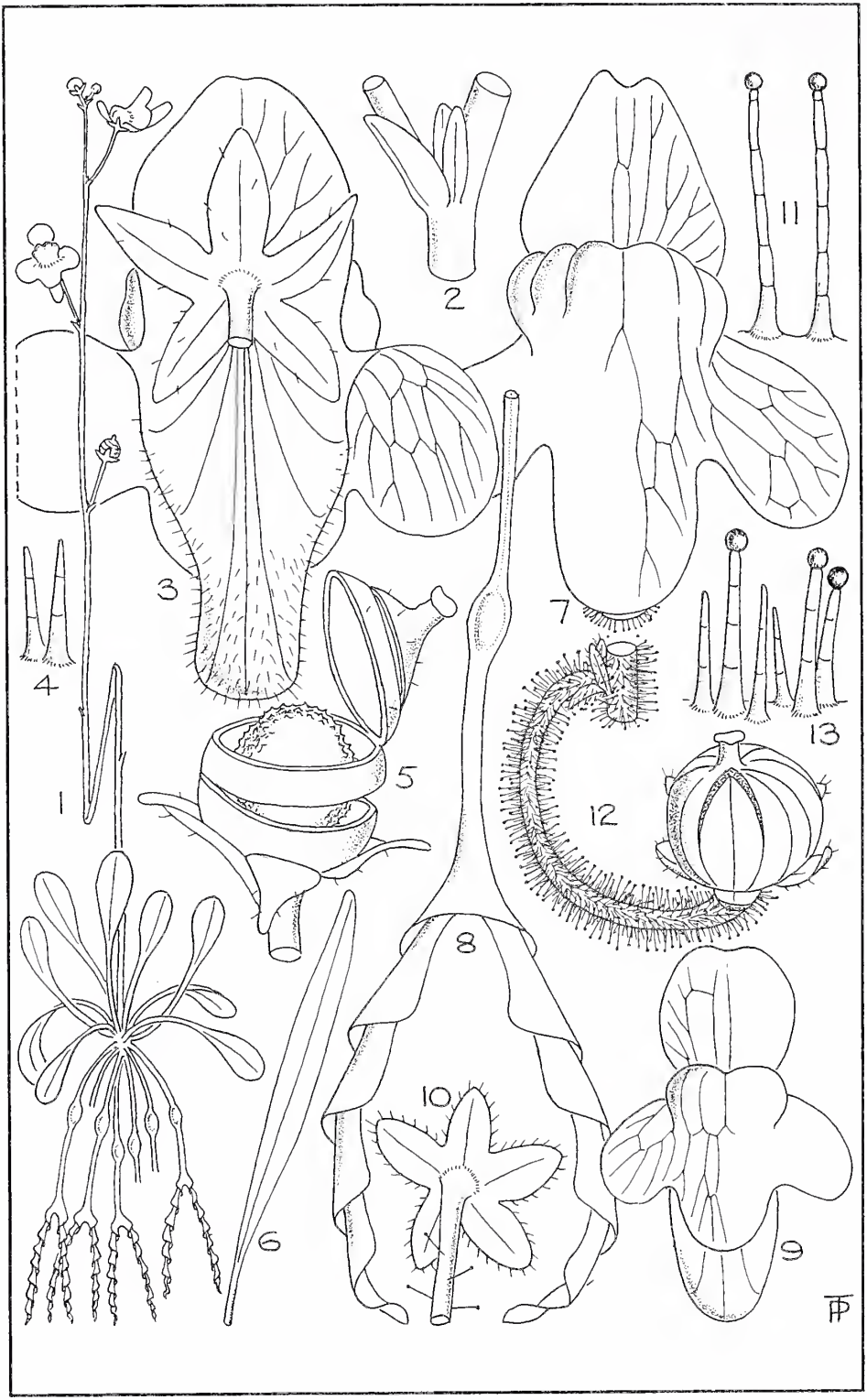
terete, cylindrical, circular in cross-section (fig. 71).

3-dentate, divided into three teeth (fig. 57).

truncate, as though cut off at the end.

verrucose, covered with warts or small rough excrescenses.

verticillate, whorled, like the spokes of a wheel.

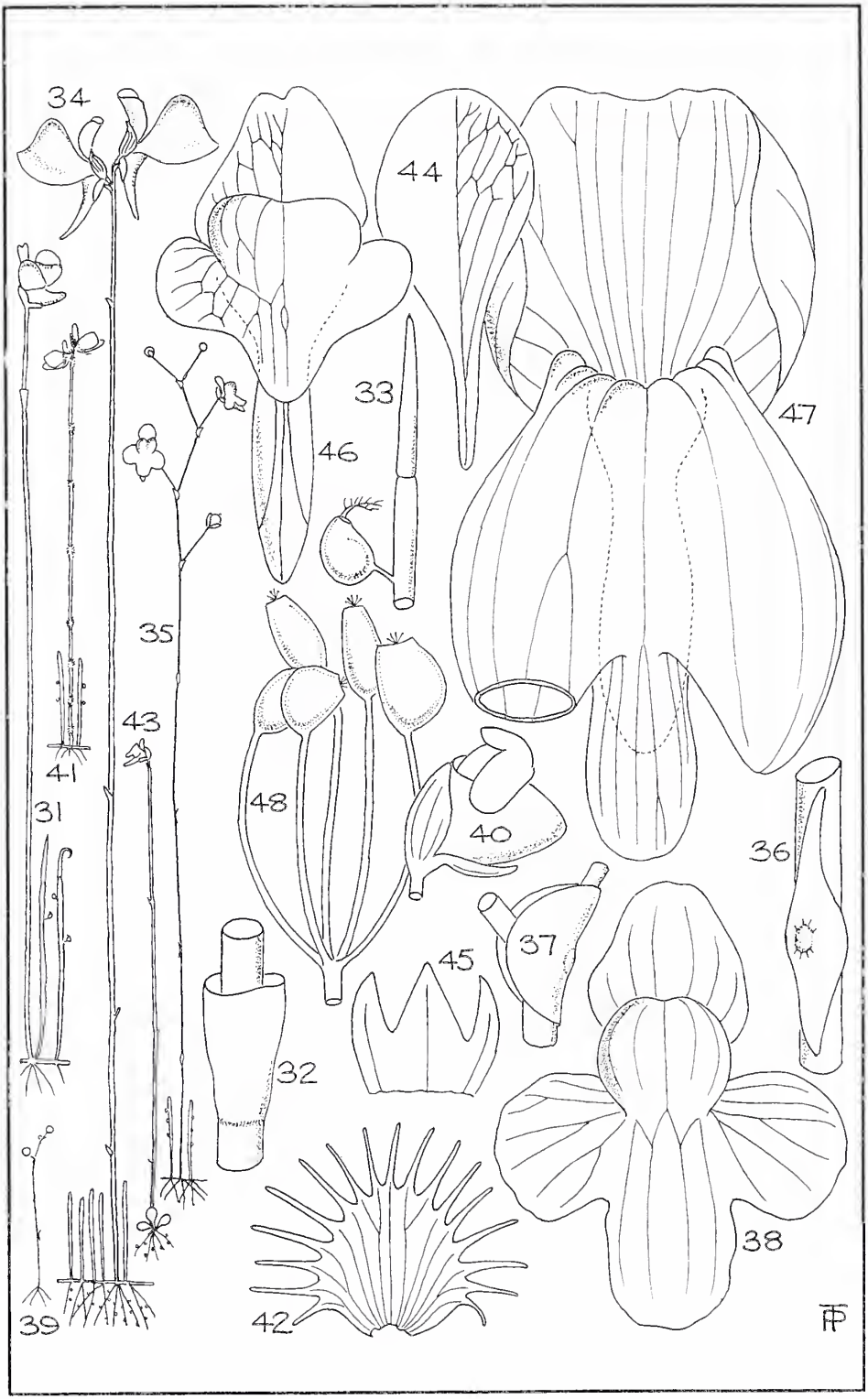

1
2
3
4
5
6
7
8
9
10
11
12
13

Reproduced by permission of the Board of Trustees of the Royal Botanic Gardens, Kew.

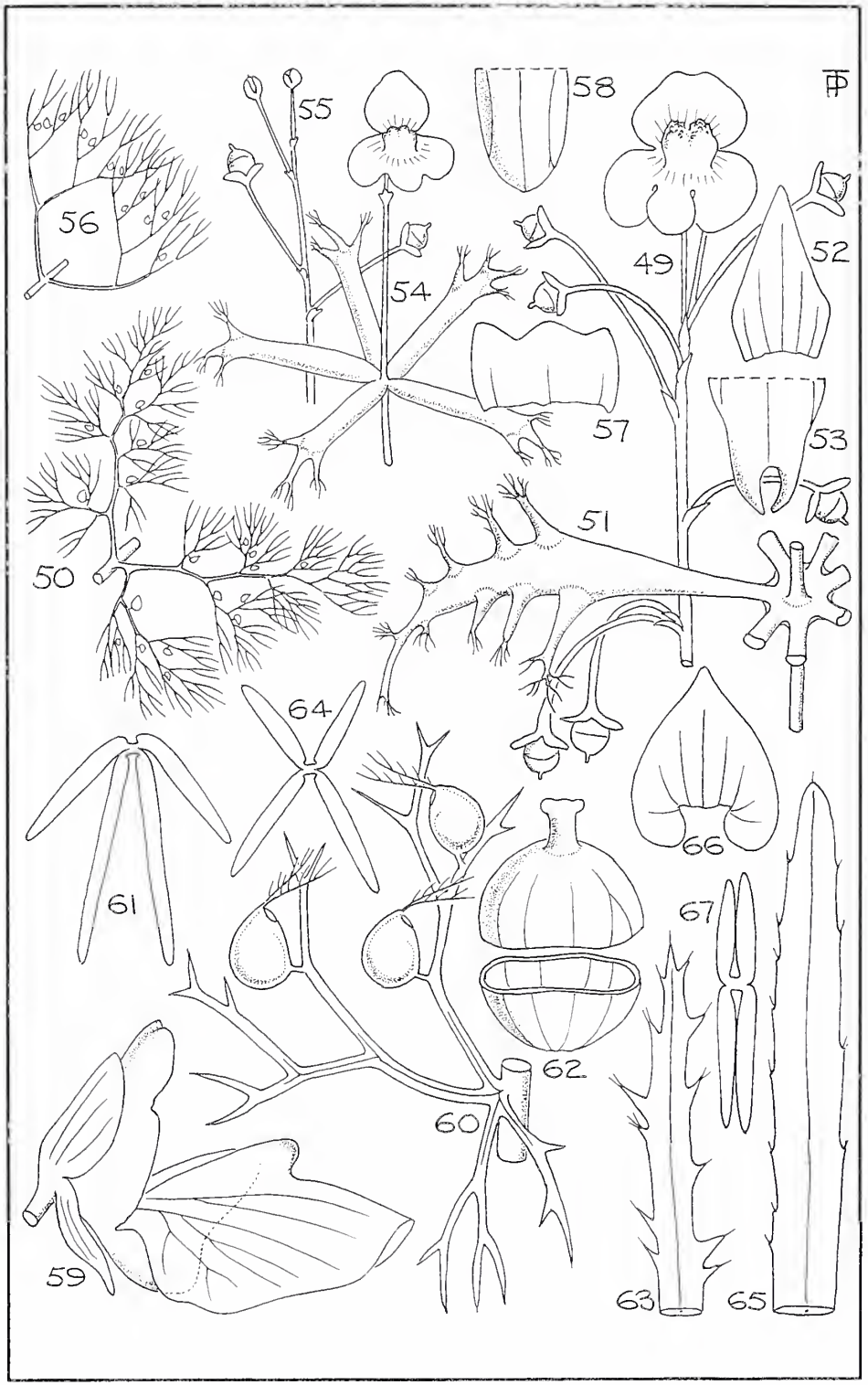
I. GENLISEA, **G. subglabra,** 1, plant, natural size; 2, bract and bracteoles in situ, enlarged; 3, flower, from rear, enlarged; 4, simple hairs on corolla, greatly enlarged; 5, dehisced capsule (section Genlisea), enlarged, **G. angolensis,** 6, leaf, natural size, **G. africana,** 7, flower from front, enlarged, **G. pallida,** 8, trap, enlarged, **G. filiformis,** 9, flower from front, enlarged; 10, calyx and part of pedicel, enlarged; 11, gland-tipped hairs on pedicel, greatly enlarged, **G. violacea,** 12, dehiscing valvate capsule (section Tayloria) with pedicel, enlarged, **G. sanariapoana,** 13, gland-tipped and simple hairs on pedicel, greatly enlarged.

CUL
CLL
UC
Brl
Pc
Br
LC
S
19
R
15
16
14
Pu
17
18
Sc
21
L
20
22
30
29
24
28
23
25
27
26

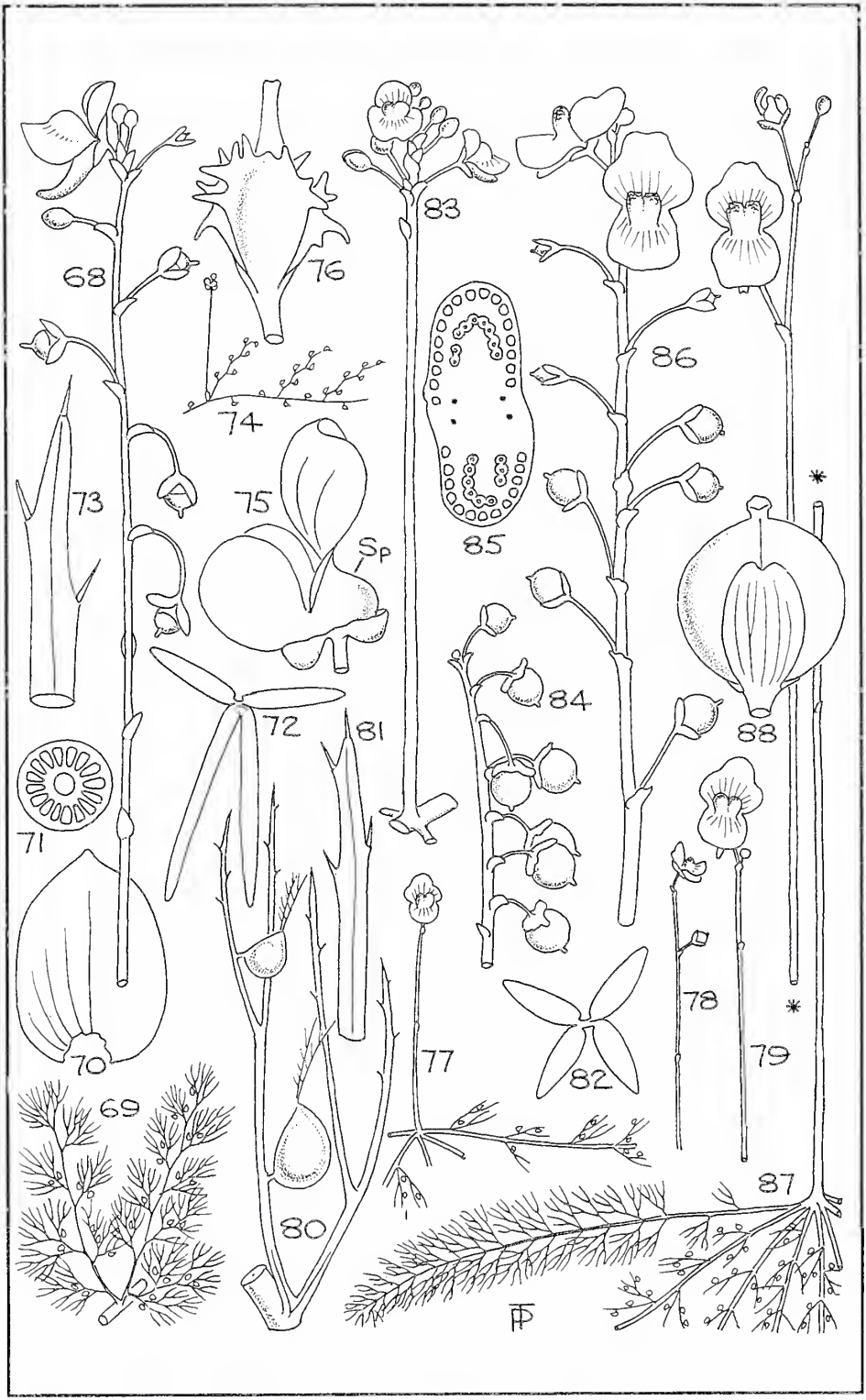
II. UTRICULARIA, a typical terrestrial and a typical aquatic species, **U. juncea,** 14, plant, natural size, R - raceme, Pu - peduncle, Sc - scale, L - leaf; 15, leaf with traps, enlarged; 16, scale, enlarged; 17, bract, enlarged; 18, bracteole, enlarged; 19, flower, in situ, lateral view, enlarged, Br - bract, Brl - bracteole, Pc - pedicel, UC - upper calyx lobe, LC - lower calyx lobe, CUL - corolla upper lip, CLL - corolla lower lip, S - spur; 20, calyx, enlarged; 21, plant with cleistogamous flowers, natural size; 22, cleistogamous flower, enlarged, **U. geminiscapa,** 23, plant, with chasmogamous and cleistogamous inflorescences, natural size; 24, leaf-segments, with traps, enlarged; 25, apex of leaf-segment, greatly enlarged; 26, quadrifid gland from inside trap, greatly enlarged; 27, bract, enlarged; 28, capsule from cleistogamous flower, with pedicel and bract insitu, enlarged; 29, dehisced circumscissile capsule, enlarged; 30, cleistogamous flower, enlarged.


34
44
33
47
46
35
43
41
31
48
40
36
37
45
32
38
39
42

III. UTRICULARIA, **U. resupinata,** 31, plant, natural size; 32, tubular bract, enlarged; 33, apex of leaf, with septum and trap, enlarged, U. cornuta, 34, plant, natural size, **U. subulata**, 35, plant, natural size; 36, basisolute scale, in situ, enlarged; 37, basisolute, peltate bract, in situ, enlarged; 38, flower, from front, enlarged; 39, cleistogamous plant, natural size; 40, cleistogamous flower, lateral view, enlarged, **U. simulans**, 41, plant, natural size; 42, fimbriate calyx lobe, enlarged, **U. amethystina**, 43, plant, natural size; 44, leaf, enlarged; 45, connate bract and bracteoles, enlarged; 46, flower, from front, enlarged, **U. purpurea**, 47, flower, from front, with apex of one saccate corolla lobe removed, and spur shown in dotted line, enlarged; 48, verticillate leaf-segments with teminal traps, enlarged.


55
58
56
49
52
54
57
53
51
50
64
61
66
67
62
60
59
63
65

IV. UTRICULARIA, **U. inflata,** 49, raceme, with flower and capsules, natural size; 50, leaf, with the two halves unequal, natural size; 51, whorl of floats, with all but one removed, natural size; 52, bract, enlarged; 53, apex of spur, enlarged; **U. radiata,** 54, raceme and whorl of floats, natural size; 55, raceme, with capsules; 56, leaf, with the two halves equal, natural size; 57, bract, enlarged; 58, apex of spur, enlarged, **U. minor,** 59, flower, lateral view, with subsaccate spur shown part in dotted line, enlarged; 60, leaf, with traps, enlarged; 61, quadrifid gland from inside trap, greatly enlarged; 62, dehisced circumscissile capsule, enlarged, **U. ochroleuca,** 63, leaf-segment, enlarged; 64, quadrifid gland from inside trap, greatly enlarged, **U. intermedia**, 65, leaf-segment, enlarged; 66, auriculate bract, enlarged; 67, quadrifid gland from insie trap, greatly enlarged.


68
76
83
74
86
73
75
Sp
85
72
81
84
88
71
70
77
82
78
79
69
80
87

V. UTRICULARIA, **U. macrorhiza,** 68, raceme and part of peduncle, natural size; 69, leaf, natural size; 70, bract, enlarged; 71, transverse section of stolon, enlarged; 72, quadrifid gland from inside trap, greatly enlarged; 73, apex of leaf-segment, enlarged, **U. olivacea**, 74, plant, natural size; 75, flower, lateral view, enlarged, Sp - saccate spur; 76, capsule and calyx with denticulate margins, enlarged, **U. gibba,** 77, plant, natural size; 78, inflorescence with flower and fruit, natural size; 79, inflorescence, large flowered form, natural size; 80, leaf-segments with traps, enlarged; 81, apex of leaf-segment, much enlarged; 82, quadrifid gland from inside trap, greatly enlarged, **U. foliosa**, 83, inflorescence, with flowers and part of stolon at the base, natural size; 84, raceme, with capsules, natural size; 85, transverse section of stolon, much enlarged, **U. floridana**, 86, raceme, natural size, **U. striata,** 87, plant, natural size; 88, valvate capsule, enlarged.

Utricularia fulva—Near Darwin, Australia. P. Taylor/Kew photo. Close shot, Peter Taylor acknowledges this to be his favorite species.

Utricularia chrysantha—Australia. Bill Lavarack photo (P. Taylor/Kew collection). Note particularly stocky, thick almost succulent peduncle in this very dry growing situation.

Utricularia leptoplectra—Near Darwin, Australia. P. Taylor/Kew photo.

Utricularia jamesoniana—South America. Carlyle Luer photo (P. Taylor/Kew collection).

World List of Genus *Utricularia* (Revised)

Our last world list of carnivorous plants was published in CPN in 1986 (CPN: 15, double issue No. 3-4). Since that time, considerable progress has been made in revising various carnivorous plant genera. We will, from time to time as material is more or less finalized, be publishing revised lists of genera. Since the publication of Peter Taylor's monograph, The Genus *Utricularia*, by Her Majesty's Stationery Office (London) as a special edition of Kew Bulletin in 1989 (Additional Series XIV), publication of a revised list of this genus is necessary.

We would like to thank author Peter Taylor, officials of the Royal Botanic Gardens (Kew), and HMSO for allowing us to abstract certain material from this excellent monograph in preparing this CPN list revision. Of course, detailed descriptions, reasoning for taxonomic decisions, and the famous Taylor drawings may be referred to in the monograph.

The list, which follows, is conceived in two portions. The first list is of the generic sections and the 214 species recognized by Taylor in his monograph. You will note that each section and species is preceded by a number which coincides with the section and species numbered chapters discussing the section or species in Taylor's monograph, and also corresponding to certain synonyms and unacceptable epithets as listed in the second portion below.

For the amateur, a genus section is somewhat parallel to what a subspecies is to a species. Thus, Taylor recognizes 35 "subgenera", or sections, to use the proper term. The sections are based on taxonomic affinities which may by chance in certain sections correlate with geographic groupings, but not necessarily always so. The use of italics is dispensed with in the first portion of the list.

In the second portion of this list, acceptable sections and species are in **bold** print followed by the monograph chapter number, unacceptable section names, epithets, etc., are listed in *italics* followed by an "=" sign and then the reference number of the section or species name more correct for that entity so that one can easily cross refer to the first part of the list or the monograph itself.

The Genus *Utricularia*

List 1 — Sections and Species with Reference Numbers

A section number is precede by a "#" and the section is in caps. Species are in lower case.

#1 POLYPOMPHOLYX
- 1 tenella
- 2 multifida

#2 TRIDENTARIA
- 3 westonii

#3 PLEIOCHASIA
- 4 menziesii
- 5 volubilis
- 6 helix
- 7 benthamii
- 8 inaequalis
- 9 violacea
- 10 dichotoma
- 11 terrae-reginae
- 12 novae-zelandiae
- 13 monanthos
- 14 uniflora
- 15 kimberleyensis
- 16 georgei
- 17 hamiltonii
- 18 triflora
- 19 arnhemica

20 tridactyla
21 singeriana
22 fistulosa
23 tubulata
24 lasiocaulis
25 kamienskii
26 kenneallyi
27 leptorhyncha
28 albiflora
29 quinquedentata
30 holtzei
31 rhododactylos
32 cheiranthos
33 capilliflora
34 dunlopii
35 dunstaniae
36 antennifera

#4 MEIONULA
37 minutissima
38 hirta
39 geoffrayi

#5 AUSTRALES
40 lateriflora
41 delicatula
42 simplex

#6 NIGRESCENTES
43 caerulea
44 warburgii
45 bracteata

#7 CALPIDISCA
46 firmula
47 troupinii
48 welwitschii
49 odontosepala
50 microcalyx
51 bisquamata
52 pentadactyla
53 arenaria
54 livida
55 sandersonii

#8 LLOYDIA
56 pubescens

#9 CANDOLLEA
57 podadena

#10 ARANELLA
58 fimbriata
59 simulans
60 longeciliata
61 sandwithii
62 blanchetii
63 parthenopipes
64 laciniata
65 purpureocaerulea
66 costata

#11 MARTINIA
67 tenuissima

#12 PSYLLOSPERMA
68 hintonii
69 petersoniae
70 schultesii
71 panamensis
72 hispida
73 praelonga
74 calycifida
75 huntii
76 longifolia

#13 FOLIOSA
77 amethystina
78 tridentata
79 tricolor

#14 ENSKIDE
80 chrysantha
81 fulva

#15 OLIGOCISTA
82 bifida
83 odorata
84 involvens
85 bosminifera
86 cecilii
87 praeterita
88 albocaerulea
89 lazulina
90 spiralis
91 tortilis
92 uliginosa
93 smithiana
94 pobeguinii
95 wightiana
96 chiribiquitensis
97 laxa
98 lloydii

99 meyeri
100 erectiflora
101 adpressa
102 polygaloides
103 reticulata
104 delphinioides
105 arcuata
106 graminifolia
107 pierrei
108 circumvoluta
109 scandens
110 recta
111 micropetala
112 macrocheilos
113 prehensilis
114 andongensis
115 foveolata
116 heterosepala
117 vitellina
118 letestui

#16 CHELIDON
119 mannii

#17 ORCHIDIOIDES
120 alpina
121 praetermissa
122 buntingiana
123 unifolia
124 endresii
125 asplundii
126 jamesoniana
127 quelchii
128 campbelliana

#18 IPERUA
129 geminiloba
130 nephrophylla
131 reniformis
132 nelumbifolia
133 humboldtii

#19 STYLOTHECA
134 guyanensis

#20 STOMOISIA
135 cornuta
136 juncea

#21 BENJAMINIA
137 nana

#22 KAMIENSKIANA
138 peranomala

#23 PHYLLARIA
139 brachiata
140 christopheri
141 forrestii
142 kumaonensis
143 multicaulis
144 salwinensis
145 steenisii
146 furcellata
147 striatula
148 pulchra
149 moniliformis
150 garrettii
151 corynephora

#24 OLIVERIA
152 appendiculata

#25 SPRUCEA
153 viscosa

#26 AVESICARIA
154 neottioides
155 oliveriana

#27 MIRABILES
156 mirabilis
157 heterochroma

#28 CHORISTOTHECAE
158 determannii
159 choristotheca

#29 AVESCARIOIDES
160 rigida
161 tetraloba

#30 STEYERMARKIA
162 aureomaculata
163 steyermarkii

#31 SETISCAPELLA
164 physoceras
165 subulata
166 pusila
167 stanfieldii
168 triloba
169 flaccida
170 nervosa

171 nigrescens
172 trichophylla

#32 NELIPUS
173 limosa
174 leptoplectra
175 biloba

#33 LECTICULA
176 resupinata
177 spruceana

#34 UTRICULARIA
178 punctata
179 gibba
180 striata
181 floridana
182 vulgaris
183 macrorhiza
184 australis
185 intermedia
186 ochroleuca
187 bremii
188 minor
189 dimorphantha
190 aurea
191 inflexa
192 stellaris
193 muelleri
194 reflexa
195 raynalii
196 warmingii
197 geminiscapa
198 hydrocarpa
199 poconensis
200 perversa
201 radiata
202 platensis
203 inflata
204 incisa
205 breviscapa
206 benjaminiana
207 foliosa
208 cymbantha
209 naviculata
210 biovularioides
211 olivacea

#35 VESICULINA
212 purpurea
213 myriocista
214 cucullata

The Genus *Utricularia*

List 2 — Expanded list with synonyms

Akentra Benj. = #34
A. inflata Benj. = 206
Antirrhinum aphyllum Linn f. = 51
Aranella Barnhart = #10
A. fimbriata (Kunth.) Barnhart = 58
A. fimbriata auct. = 59, 60
Askofake Raf. = #15
A. recurva (Lour.) Raf. = 82
Avesicaria (Kamienski) Barnhart = #26
A. neottioides (A. St. Hil. & Girard) Barnhart = 154
Biovularia Kamienski = #34
B. brasiliensis Kuhlm. = 211
B. cymbantha (Oliver) Kamienski = 208
B. minima (Warm.) Kamienski = 211
B. olivacea (Wright ex Griseb.) Kamienski = 211
Bucranion Raf. = #7
B. capense (Sprengel) Raf. = 51
Calpidisca Barnhart = #7
C. amethystina (A. St. Hil. & Girard) Barnhart = 77
C. calycifida (Benj.) Gleason = 74
C. capensis (Sprengel) Barnhart = 51
C. denticulata (Benj.) Barnhart = 54
C. hispida (Lam.) Barnhart = 72
C. humboldtii (Schomb.) Gleanson = 133
C. lundii (A. DC.) Moldenke = 73
C. modesta (A. DC.) Barnhart = 77
C. roraimensis (N. E. Br.) Gleason = 77
C. standleyae Barnhart = 77
C. takenakai Nakai = 43
Cosmize Raf. = #1
C. coccinea Raf. = 2
C. longeciliata (A. DC.) Small = 60
C. longeciliata auct. = 59
C. multifida (R. Br.) Barnhart = 2
Diurospermum Edgew. = #23
D. album Edgew. = 142
Drosera incisa a. Rich. = 204
Enetophyton Nieuwl. = #31
E. cleistogamum Nieuwl. = 165
Enskide Raf. = #14
E. barbata (R. Br.) Raf. = 80
E. chrysanthea (R. Br.) Raf. = 80
E. flava (R. Br.) Raf. = 80
Hamulia Raf. = #34
H. alba Raf. = 191
H. flava Raf. = 192
Lecticula Barnhart = #33
L. resupinata (Greene ex Bigelow) Barnhart = 176

L. spruceana (Oliver) Barnhart = 177
Lemnopsis Zippel = #23
L. mnioides Zippel = 147
Lentibularia Seguier = #34
L. intermedia (Hayne) Nieuwl. & Lunell = 185
L. major Gilib. = 182
L. minor (L.) Raf. = 188
L. vulgaris (L.) Moench = 182
L. vulgaris (L.) Moench var. *americana* (A. Gray) Nieuwl. & Lunell = 183
Lepiactis Raf. = #34
L. stellaris (Linn. f.) Raf. = 192
Linaria aphylla (Linn. f.) Sprengel = 51
Megopiza = Megozipa
Megozipa Raf. = #34
M. fornicuta (LeConte) Raf. = 179
M. integra (LeConte) Raf. = 179
M. longirostris (LeConte) Raf. = 179
M. macrorhiza (LeConte) Raf. = 183
Meinula Raf. = #4
M. parviflora Raf. = 37
Meloneura Raf. = #23
M. purpurea Raf. = 147
M. striatula (Sm.) Barnhart = 147
Nelipus Raf. = #32
N. bifida (L.) Raf. = 82
N. biloba (R. Br.) Raf. = 175
N. limosa (R. Br.) Raf. = 173
N. spiralis (Sm.) Raf. = 90
Orchyllium Barnhart = #17
O. alpinum (Jacq.) Barnhart = 120
O. campbellianum (Oliver) Gleason = 128
O. endresii (H. G. Reichb.) Barnhart ex McIntyre & Chrysler = 124
O. humboldtii (Schomb.) Barnhart = 133
O. quelchii (N. E. Br.) Gleason = 127
O. Schimperi (Schenk) Barnhart = 126
Pelidnia Barnhart = #6
P. caerulea (L.) Barnhart = 43
Personula Raf. = #20
P. grandiflora Raf. = 136
Philydrum Cavalerieri Leveille = 82
Plectoma Raf. = #34
P. inflata (Walter) Raf. = 203
P. stellata Raf. = 203
Peiochasia (Kamienski) Barnhart = #3
P. dichotoma (Labill.) Barnhart = 10
Plesisa Raf. = #34
P. bipartita (Elliott) Raf. = 179
Polypompholyx Lehm. = subg. 1; #1
Polypompholyx auct. = #3, #10, #15
P. bicolor Klotzsch. = 59
P. endlicheri Lehm. = 2
P. exigua F. Muell. = 1
P. holtzei F. Muell. = 30
P. laciniata Benj. = 59, 60
P. laciniata Benj. var. *rubrocalcarata* Griseb. = 59
P. latiloba (Benth.) Lehm. = 2
P. longeciliata (A. DC.) L. B. Sm. = 60
P. madecassa Perrier = 109
P. multifida (R. Br.) F. Muell. = 2
P. schomburgkii Klotzsch = 50
P. tenella (R. Br.) Lehm. = 1
Saccolaria Kuhlm. = #34
S. biovularioides Kuhlm. = 210
Sacculina Bosser = #34
S. madecassa Bosser = 208
Setiscapella Barnhart = #31
S. cleistogama (A. Gray) Barnhart = 165
S. pusilla (Vahl) Barnhart ex Britton & Wilson = 166
S. subulata (L.) Barnhart = 165
Stomoisia Raf. = #20
S. cornuta (Michx.) Raf. = 135
S. juncea (Vahl.) Barnhart = 136
S. spicata (Sylven) Gleason = 100
S. virgatula (Barnhart) Barnhart = 136
Tetralobus A. DC. = #1
T. preissei A. DC. = 2
T. pusillus A. DC. = 1
Trilobulina Raf. = #34
T. crenata (Vahl.) Raf. = 179
T. fibrosa (Walter) Raf. = 179
T. striata (LeConte ex Torrey) Raf. = 180
Trixapias Raf. = #4
T. capillacea (Vahl.) Raf. = 38
Utricularia L. subgenus *Aranella* (Barnhart) Komiya = #10
Utricularia L. subgenus *Avesicaria* (Kamienski) Komiya = #26
Utricularia L. subgenus *Bivalvaria* Kurz = #23
Utricularia L. subgenus *Dividirostra* Komiya = #3, #23
Utricularia L. subgenus *Glanduliferieascidea* Komiya = #6, #7, #10
Utricularia L. subgenus *Lentibularia* (Seguier) Kurz = #34
Utricularia L. subgenus *Phyllaria* Kurz = #23
Utricularia L. subgenus **Polypompholyx** (Lehm.) P. Taylor subgen. 1
Utricularia L. subgenus *Setiscapella* (Barnhart) Komiya = #31
Utricularia L. subgenus *Simplicirostra* Komiya = #17, #20, #29
Utricularia L. subgenus **Utricularia** subgen. 2
Utricularia L. subgenus *Vesiculina* (Raf.) Komiya = #35
Utricularia L. section **Aranella** (Barnhart) P. Taylor #10
Utricularia L. section **Australes** P. Taylor #5
Utricularia L. section **Avesicaria** Kamienski #26
Utricularia L. section **Avesicarioides** Komiya #29
Utricularia L. section **Benjaminia** P. Taylor #21
Utricularia L. section **Calpidisca** (Barnhart) Komiya #7
Utricularia L. section **Candollea** P. Taylor #9
Utricularia L. section **Chelidon** P. Taylor #16
Utricularia L. section **Choristothecae** P. Taylor #28

Utricularia L. section **Enskide** (Raf.) P. Taylor #14
Utricularia L. section **Foliosa** Kamienski #13
Utricularia L. section **Iperua** P. Taylor #18
Utricularia L. section **Kamienskia** P. Taylor #22
Utricularia L. section **Lecticula** (Barnhart) Komiya #33
Utricularia L. section *Lentibularia* (Seguier) A. DC. = #34
Utricularia L. section *Lepipactus* (Raf.) Kuntze = #34
Utricularia L. section **Lloydia** P. Taylor #8
Utricularia L. section *Macroceras* Kamienski = #3
Utricularia L. section **Martinia** P. Taylor #11
Utricularia L. section *Magacista* A. DC. = #34
Utricularia L. section **Meionula** (Raf.) P. Taylor #4
Utricularia L. section *Meloneura* (Raf.) Komiya = #23
Utricularia L. section **Mirabiles** P. Taylor #27
Utricularia L. section **Nelipus** (Raf.) P. Taylor #32
Utricularia L. section *Neottioides* Luetz. = #26
Utricularia L. section **Nigrescentes** (Oliver) Komiya #6
Utricularia L. section **Oligocista** A. DC. #15
Utricularia L. section **Oliveria** P. Taylor #24
Utricularia L. section **Orchidioides** A. DC. #17
Utricularia L. section *Parcifolia* Kamienski = #34
Utricularia L. section **Phyllaria** (Kurz) Kamienski #23
Utricularia L. section **Pleiochasia** Kamienski #3
Utricularia L. section **Polypompholyx** (Lehm.) P. Taylor #1
Utricularia L. section **Psyllosperma** P. Taylor #12
Utricularia L. section **Setiscapella** (Barnhart) P. Taylor #31
Utricularia L. section **Sprucea** P. Taylor #25
Utricularia L. section **Steyermarkia** P. Taylor #30
Utricularia L. section **Stomoisia** (Raf.) Kuntze #20
Utricularia L. section *Stomoisia* auct. = #15
Utricularia L. section **Stylotheca** A. DC. #19
Utricularia L. section **Tridentaria** P. Taylor #2
Utricularia L. section **Utricularia** #34
Utricularia L. section **Vesiculina** (Raf.) P. Taylor #35
Utricularia L. section 'group' *Nigrescentes* Oliver = #6
Utricularia aberrans Bosser = 48
U. acicularis Solander ex Stapf = 51
U. acuta Benj. = 106
U. adenantha Standley = 77, 153
U. adpressa Salzm. ex A. St. Hil. & Girard 101
U. adpressa auct. = 96
U. affinis Wight = 92
U. affinis Wight var. *griffithii* (Wright) Oliver ex C.B. Clarke = 92
U. afromontana R. E. Fries = 54
U. alata Benj. = 82
U. alba Hoffsgg. ex Link = 179
U. albiflora R. Br. 28
U. albiflora R. Br. var. *quinquedentata* F. Muell. = 29
U. albiflora Griff. = 43
U. albiflora auct. 29
U. albina Ridley = 43
U. albocaerulea Dalz. 88
U. alpina Jacq. 120
U. alpina auct. = 123, 124, 185
U. alutacea Tutin = 77
U. amazonasana Steyerm. = 198
U. ambigua A. DC. = 179
U. amethystina Salzm. ex A. St. Hil. & Girard 77
U. amethystina Salzm. ex A. St. Hil. & Girard forma *alutacea* (Tutin) Steyerm. = 77
U. amethystina auct. = 72, 78
U. amoena Pilger = 213
U. amphibia Welw. ex Kamienski = 179
U. andicola Benj. = 54
U. andongesis Welw. ex Hiern 114
U. angolensis Kamienski = 165
U. angulosa Poiret = 136
U. angustifolia Benj. = 72
U. anomala A. St. Hil. & Girard = 179
U. antennifera P. Taylor 36
U. anthropophora Ridley = 147
U. antirrhinoides Wallich = 82
U. aphylla Raf., end
U. aphylla Ruiz & Pavon = 179
U. aphylla Vellozo = 77
U. appendiculata E. A. Bruce 152
U. appressa Benj. = 101
U. arcuata Wight 105
U. arenaria A. DC. 53
U. arenicola Tutin = 137
U. arenicola Tutin var. *kavanayena* Steyerm. = 137
U. arnhemica P. Taylor 19
U. arrojadensis Mcrl ex Luetz. = 76
U. asplundii P. Taylor 125
U. aurea Lour. 190
U. aurea Ridley = 117
U. aurea auct. = 178
U. aureola S. F. Blake = 101
U. aureolimba Steyerm. = 101
U. aureomaculata Steyerm. 162
U. australis R. Br. 184
U. australis R. Br., forma *tenuicaulis* (Miki) Komiya & Shibata = 184
U. ayacuchae Steyerm. = 214
U. baldwinii Steyerm. = 72
U. bangweolensis R. E. Fries = 194
U. baoulensis A. Chev. = 115
U. barbata R. Br. = 80
U. barnesii F. Lloyd = 37
U. baueri R. Br. = 175
U. baueri auct. = 43
U. baumii Kamienski = 90
U. baumii Kamienski var. *leptocheilos* Pellegrin = 90
U. benjaminiana Oliver 206

U. benthamii P. Taylor 7
U. bicolor A. St. Hil. & Girard = 77
U. bifida L. 82
U. bifida L. var. *bosminifera* (Ostenf.) Maxwell = 85
U. bifida L. var. *wallichiana* (Wight) Thwaites = 109
U. bifida Bojer ex A. DC. = 113
U. bifida Macrae ex A. DC. = 43
U. bifida auct. = 108, 173
U. bifidocalcar R. Good = 179
U. biflora Lam. = 179
U. biflora Bonpl. ex A. DC. = 179
U. biflora Hayata = 82
U. biflora Roxb. = 179
U. biflora Wallich = 82
U. billardieri F. Muell. = 10
U. biloba R. Br. 175
U. biloba auct. = 173
U. biovularioides (Kuhlm.) P. Taylor 210
U. bipartita Elliott = 179
U. x biseriata Lindb. f. = 182
U. bisquamata Schrank 51
U. blanchetii A. DC. 62
U. blumei (A. DC.) Miq. = 190
U. bolivarana Steyerm. = 77
U. bosminifera Ostenf. 85
U. botecudorum A. St. Hil. & Girard = 207
U. brachiata Oliver 139
U. brachyceras Schltr. = 51
U. brachypoda Wight = 92
U. bracteata R. Good 45
U. bradei Markgraf = 165
U. bramadensis Merl ex Luetz. = 76
U. brehmii F. Schulz = 187
U. bremei Rothmaler = 187
U. bremii Heer ex Kolliker 187
U. brevicaulis Benj. = 82
U. brevicornis Calak. = 186
U. brevilabris Lace = 37
U. brevilabris Lace var. *parviflora* Pellegrin = 37
U. breviscapa Wright ex Griseb. 205
U. bryophila Ridley = 119
U. bryophylla Henriques = 119
U. buntingiana P. Taylor 122
U. butanensis Merl ex Luetz. = 207
U. caerulea L. 43
U. caerulea L. var. *affinis* (Wight) Thwaites = 92
U. caerulea L. var. *B* Oliver = 95
U. caerulea L. var. *filicaulis* (Wallich ex A. DC.) Haines = 43
U. caerulea L. var. *graminifolia* (Vahl) Bhattacharyya = 106
U. caerulea L. var. *smithiana* (Wight) C. B. Clarke = 93
U. caerulea L. var. *squamosa* (Wight) C. B. Clarke = 95
U. caerulea L. var. *stricticaulis* Koenig = 102
U. caerulea auct. = 90, 91, 92, 93, 103, 106
U. calliphysa Stapf = 37
U. calumpitensis Llanos = 190
U. calycifida Benj. 74
U. campbelliana Oliver 128
U. campbelliana Oliver var. *minor* Steyerm. = 128
U. campestris Miq. = 43
U. canacorum Pellegrin = 12
U. capensis Sprengel = 51
U. capensis Sprengel var. *brevicalcarata* Oliver = 51
U. capensis Sprengel var. *elatior* Kamienski = 51
U. capensis auct. = 56
U. capillacea Willd., end
U. capillacea Wight ex Oliver = 37
U. capillacea auct. = 38
U. cappilaris D. Don = 43
U. capillaris Hoffsgg. ex Roem. & Schult. = 165
U. capilliflora F. Muell. 33
U. cavalerii Stapf = 43
U. cearana Steyerm. = 100
U. cecilii P. Taylor 86
U. certophylla Michx = 203
U. ceratophylloides O. Schwarz = 173 or 174
U. cernua Hoffsgg. ex Benj. = 207
U. cervicornuta Perrier = 206
U. chamissonis Weber ex Benj. = 79
U. charnleyensis W. Fitzg. = 43
U. charoidea Stapf = 194
U. cheiranthos P. Taylor 32
U. chiribiquitensis Fernandez-Perez 96
U. choristotheca P. Taylor 159
U. christopheri P. Taylor 140
U. chrysantha R. Br. 80
U. circumvoluta P. Taylor 108
U. clandestina Nuttall ex A. Gray = 197
U. cleistogama (A. Gray) Britton = 165
U. coccinea Benj. = 198
U. coerulea uact. = 43
U. colensoi J. D. Hook. = 12
U. colorata Benj. = 97
U. complanata Wallich = 43
U. compressa R. Br., end.
U. concinna N. E. Br. = 126
U. conferta Wight = 106
U. conferta Hassk. = 179
U. conferrta auct. = 114
U. confervifolia Jacks ex D. Don = 190
U. congesta Steyerm. = 59
U. congesta Steyerm. forma *deminutiva* Steyerm. = 59
U. connellii N. E. Br. = 56
U. corenephora P. Taylor 151
U. cornuta Michx 135
U. cornuta Michx var. *michauxii* Gomez = 136
U. cornuta auct. = 97
U. costtata P. Taylor 66
U. crenata Vahl = 179
U. cucullata A. St. Hil. & Girard 214
U. cucullata Afzel. ex Kamienski = 111
U. cuspidata Steyerm. = 74
U. cutleri Steyerm. = 153

U. cyanea R. Br. = 92
U. cymbantha Oliver 208
U. damazioi Beauverd = 77
U. dawsonii Steyerm. = 77
U. decipiens Dalz. = 92
U. deightonii Lloyd & G. Taylor = 56
U. delicata Kamienski = 51
U. delicatula Cheeseman 41
U. delphinioides Thorel ex Pellegrin 104
U. delphinioides Thorel ex Pellegrin var. *minor* Pellegrin = 104
U. dentata G. Weber ex Benj. = 73
U. denticulata Benj. = 54
U. dettermannii P. Taylor 158
U. diantha Roxb. ex Roem. & Schult. = 179
U. diantha auct. = 82
U. dicardia Standley = 100
U. dichotoma Labill. 10
U. dichotoma Labill. var. *uniflora* (R. Br.) Benth. = 14
U. diflora Roxb. = 179
U. dimorphantha Makino 189
U. diploglossa Welw. ex Oliver = 194
U. dissectifolia Merl ex Luetz. = 169
U. dregei Kamienski = 54
U. dregei Kamienski var. *stricta* Kamienski = 54
U. dubia Benj. = 137
U. dubia Rosellini ex Cesati *et. al.* = 184
U. dubia macroptera (G. Brueckner) E. H. L. Krause, end
U. dubia ochroleuca E. H. L. Krause = 186
U. dunlopii P. Taylor 34
U. dunstani F. Lloyd = 35
U. dunstaniae F. Lloyd = 35
U. dusenii Sylven = 130
U. dusenii Sylven var. *corcovadensis* Merl ex Luetz. = 130
U. eburnea R. E. Fries = 54
U. ecklonii Sprengel = 51
U. ecklonii Sprengel var. *lutea* Perrier = 46
U. ecklonii auct. = 53
U. elachista Goebel = 92
U. elegans Wallich ex Oliver = 179
U. elephas Luetz. = 214
U. elevata Kamienski = 54
U. elevata Kamienski var. *macowani* Kamienski = 54
U. elmeri Stapf = 116
U. emarginata Benj. = 179
U. endresii H. G. Reichb. 124
U. endresii auct. = 121
U. engleri Kamienski = 54
U. equiseticaulis Blatter & McCann = 106
U. erectiflora A. St. Hil. & Girard 100
U. erectiflora auct. = 99
U. evrardii Pellegrin = 37
U. exigua Merl ex Luetz. = 165
U. exilis Oliver = 53
U. exilis Oliver var. *arenaria* (A. DC.) Kamienski = 53
U. exilis Oliver var. *bryoides* Welw. ex Hiern = 53
U. exilis Oliver var. *ecklonii* (Sprengel) Kamienski = 53
U. exilis Oliver var. *elatior* Kamienski = 51
U. exilis Oliver var. *hirsuta* Kamienski = 53
U. exilis Oliver var. *minor* Kamienski = 51
U. exilis Oliver var. *nematoscapa* Welw. ex Hiern = 53
U. exilis auct. = 51, 54
U. exoleta R. Br. = 179
U. exoleta R. Br. var. *lusitanica* Kamienski = 179
U. exolata auct. = 188
U. extensa Hance = 190
U. falcata R. Good = 91
U. fasciculata Roxb. = 190
U. fernaldiana Lloyd & G. Taylor = 56
U. fibrosa Walter = 179
U. fibrosa auct. = 180
U. filicaulis Wallich ex A. DC. = 43
U. filicaulis Wallich ex A. DC. var *papillosa* Pellegrin = 43
U. filiformis Roem. & Schult. = 165
U. filiformis auct. = 172
U. fimbriata Kunth 58
U. fimbriata auct. = 59
U. firmula Welw. ex Oliver 46
U. firmula auct. = 56, 165, 179
U. fistulosa P. Taylor 22
U. flaccida A. DC. 169
U. flaccida auct. = 170
U. flava R. Br. = 80
U. flexuosa Vahl = 190
U. flexuosa Vahl var. *blumei* A. DC. = 190
U. flexuosa Vahl var. *parviflora* Kamienski = 192
U. flexuosa Vahl forma *gracilis* Oliver = 190
U. flexuosa auct. = 184
U. floridana Nash 181
U. fluitans Ridley = 178
U. fluviatilis Ridley = 178
U. fockeana Miq. = 198
U. foliosa L. 207
U. foliosa L. var. *gracilis* Kamienski = 207
U. foliosa Salzm. ex A. DC. = Genlisia filiformis, end
U. foliosa auct. = 181, 192
U. fontana A. St. Hil. & Girard = 79
U. forgetiana Sander = 76
U. fornicata LeConte = 179
U. forrestii P. Taylor 141
U. foveolata Edgew. 115
U. fulva F. Muell. 81
U. furcata Pers. = 179
U. furcellata Oliver 146
U. furcellata Oliver var. *minor* C.B. Clarke = 146
U. furcellata auct. = 147
U. fusiformis Warm. = 79
U. gallaprovincialis J. Gay ex Webb = 184
U. garrettii P. Taylor 150
U. gayana A. DC. = 179
U. geminiloba Benj. 129
U. geminiscapa Benj. 197

U. genliseoides Benj. = 77
U. gentryi Standley = 54
U. geoffrayi Pellegrin 39
U. georgei P. Taylor 16
U. gibba L. 179
U. gibba L. subsp. *exoleta* (R. Br.) P. Taylor = 179
U. gibba L. subsp. *gibba* = 179
U. gibba L. subsp. *gibba* auct. = 180
U. gibba auct. = 197
U. gibbosa Hill = 179
U. gibbsiae Stapf = 109
U. gilletii DeWild. & Th. Dur. = 206
U. glandulosa G. Weber ex Benj. = Genlisea violacea, end
U. glazioviana Warm. ex Glaz. = 154
U. globulariifolia Martius ex Benj. = 79
U. globulariifolia Martius ex Benj. var. *caudta* Sylven = 79
U. globulariifolia Martius ex Benj. var. *minor* Merl ex Luetz. = 79
U. glochidiata Wight = 147
U. glueckii Luetz. = 72
U. goebelii Merl ex Luetz. = 65
U. gomezii A. DC. = 79
U. gracilis Kunth = 179
U. gracilis Lepr. ex Oliver = 179
U. grafiana Koch = 185
U. graminifolia Vahl 106
U. graminifolia Graham = 103
U. graminifolia auct. = 92
U. grandiflora Martens = 183
U. grandivesiculosa Czech. = 194
U. graniticola A. Chev. & Pellegrin = 56
U. greenei Oakes = 176
U. griffithii Wight = 92
U. guianensis Splitg. ex De Vriese = 207
U. guyanensis A. DC. 134
U. gyrans Suesseng. = 91
U. hamiltonii F. Lloyd 17
U. harlandii Oliver ex Benth = 147
U. helix P. Taylor 6
U. hertzogii Luetz. = 154
U. heterochroma Steyerm. 157
U. heterochroma auct. = 156
U. heterosepala Benj. 116
U. hians A. DC. = 113
U. hintonii P. Taylor 68
U. hirta Klein ex Link 38
U. hirta Klein ex Link var. *elongata* Pellegrin = 38
U. hirtella A. St. Hil. & Girard = 77
U. hispida Lam. 72
U. hoehnei Kuhlm. = 196
U. holtzei F. Muell. 30
U. hookeri Lehm. = 8
U. hookeri auct. = 7
U. huillensis Welw. ex Kamienski = 113
U. humbertiana Perriet = 54
U. humbertiana Perrier var. *andringitrensis* Perrier = 54
U. humboldtii Schomb. 133
U. humboldtii Schomb. forma *cuneata* Steyerm. = 133
U. humilis Vahl = 82
U. humilis Phillips = 54
U. humilis Heyne ex Wallich = 102
U. huntii P. Taylor 75
U. hydrocarpa Vahl 198
U. hydrocarpa auct. = 190, 196, 199
U. hydrocotyloides Lloyd & G. Taylor = 56
U. ianthina J. D. Hook. = 131
U. ibarensis Baker = 54
U. imerinensis Perrier = 194
U. inaequalis A. DC. 8
U. inaequalis Benj. = 190
U. incerta Kamienski = 184
U. incisa (A. Rich.) Alain 204
U. incisa auct. 205
U. inflata Walter 203
U. inflata Walter var. *minor* Chapman = 201
U. inflata Walter var. *radiata* (Small) stone = 201
U. inflata (Benj.) Miq. = 206
U. inflata Afzel. ex Kamienski = 111
U. inflata auct. = 202, 204, 205
U. inflexa Forrskal 191
U. inflexa Forsskal var. *inflexa* = 191
U. inflexa Forsstal var. *major* Kamienski = 191
U. inflexa Forsstal var. *remota* Kamienski = 191
U. inflexa Forsstal var. *stellaris* (Linn. f.) P. Taylor = 192, 193
U. inflexa Forsstal var. *tenuifolia* Kamienski = 191
U. integra LeConte ex Elliott = 179
U. intermedia Hayne 185
U. intermedia Hayne var. *robbinsii* Wood = 183
U. intermedia Hayne forma *ochroleuca* (R. Hartm.) Komiya = 186
U. intermedia x minor = 186
U. intermedia x vulgaris = 182
U. intricata Griff. ex Oliver = 92
U. involvens Ridley 84
U. itatiaiae Taub. = 129
U. jamesoniana Oliver 126
U. jamesoniana auct. = 125
U. jankae Velen. = 184
U. janthina J. D. Hook. = 131
U. japonica Makino = 184
U. jaquatibensis Merl. ex Luetz. = 76
U. juncea Vahl. 136
U. juncea Vahl forma *minima* S.F. Blake = 136
U. juncea Vahl forma *virgatula* (Barnhart) Fernald = 136
U. juncea auct. = 97, 100, under 170
U. kaieteurensis Styerm. = 77
U. kalmaloensis A. Chev. = 179
U. kamienskii F. Muell. 25
U. kenneallyi P. Taylor 26
U. kerrii Craib. = 43
U. khasiana Joseph & Mani = 179
U. kimberleyensis C. A. Gardener 15
U. kirkii Stapf = 53
U. kirkii auct. = 54

U. kuhlmannii Merl = 172
U. kumaonensis Oliver 142
U. laciniata A. St. Hil. & Girard 64
U. laciniata Buscal. = 59
U. laciniata Buscal. var. *poeppigiana* Buscal = 59
U. laciniata Martius ex Benj. = 59
U. lagoensis Warm. = 205
U. lasocaulis F. Muell. 24
U. lateriflora R. Br. 40
U. lateriflora auct. = 41
U. latilabiata Benj. = 8
U. latiloba Benth. = 2
U. lawsonii F. Lloyd = 175
U. laxa A. St. Hil. & Girard 97
U. laxa A. St. Hil. & Girard var. *gaudichaudii* A. St. Hil. & Girard = 97
U. laxa auct. = 96
U. lazulina P. Taylor 89
U. lehmanni Benj. = 51
U. leptantha Benj. = 166
U. leptoplectra F. Muell. 174
U. leptorhyncha O. Schwarz 27
U. letestui P. Taylor 118
U. lilacina Griff. = 92
U. lilliput Pellegrin = 37
U. limosa R. Br. 173
U. linarioides Welw. ex Oliver = 48
U. lindmanii Sylven = 77
U. linearifolia Benj. = 8, 10
U. linearioides Kamienski = 48
U. lingulata Baker = 113
U. lingulata G. Weber ex Benj. = 137
U. x litoralis Melander = 186
U. livida E. Meyer 54
U. livida E. Meyer var. *engleri* (Kamienski) Stapf = 54
U. livida E. Mayer var. *micrantha* Kamienski = 54
U. livida e. Meyer var. *pauciflora* Kamienski = 54
U. lloydii Merl ex F. Lloyd 98
U. lobata Fernald = 54
U. longecalcarata Benj. = 54
U. longeciliata A. DC. 60
U. longeciliata auct. = 59
U. longifolia Gardner 76
U. longifolia Gardner var. *paludosa* Merl ex Luetz. = 76
U. longirostris LeConte ex Elliott = 179
U. longissima Klotzsch, end
U. luetzelburgii Merl ex Luetz. = 199
U. lundii A. DC. = 73
U. lundii auct. = 79
U. macerrima S.F. Blake = 72
U. macrocarpa Wallich = 190, 192
U. macroceras A. DC. = 4
U. macrocheilos (P. Taylor) P. Taylor 112
U. macrolepis Wight = 109
U. macrophylla Masamunne & Syozi = 92
U. macroptera G. Brueckner, end
U. macrorhiza LeConte 183
U. macrorhyncha Barnhart = 179
U. madagascariensis A. DC. = 54
U. magnavesica R. Good = 194
U. magnifica Pilger = 213
U. maguirei Steyerm. = 74
U. mairii cheeseman = 184
U. major Schmidel = 184
U. major Koenig ex Vahl = 190
U. major Cariot & St. Lager = 182
U. malmeana Sylven = 214
U. mannii Oliver 119
U. marcelliana Merl ex Luetz. = 165
U. mauroyae Perrier 54
U. maxima G. Weber ex Benj. = 131
U. media Salzm. ex A. St. Hil. & Girard = 165
U. media Schum. = 185
U. menziesii R. Br. 4
U. menziesii R. Br. var. *macroceras* (A. DC.) Lehm. = 4
U. meyeri Pilger 99
U. micrantha Benj. = 100
U. microcalyx (P. Taylor) P. Taylor 50
U. microcarpa Dietr. = 166
U. micropetala Sm. 111
U. micropetala Sm. var. *nmacrocheilos* P. Taylorf = 112
U. micropetala Sm. var. *micropetala* = 111
U. micropetala auct. = 109, 112
U. millefolia Nuttall ex Tuckerm. = 185
U. minima Warm. = 211
U. minor L. 188
U. minor L. subsp. *bremii* (Heer ex Kolliker) K. & F. Bertsch = 187
U. minor L. var. *bremii* (Heer ex Kolliker) Franchet = 187
U. minor L. var. *multispinosa* Miki = 188
U. minor auct. = 189
U. minutissima Vahl 37
U. minutissima Vahl forma *albiflora* (Komiya) Komiya = 37
U. minutissima Bojer ex A. SC. = 165
U. mirabilis P. Taylor 156
U. mixta Barnhart = 207
U. modesta A. DC. = 77
U. monantha Benj. = 79
U. monanthos J.D. Hook. 13
U. moniliformis P. Taylor 149
U. monophylla Dinter = 53
U. montana Jacq. = 120
U. montana Poiret = 120
U. montana auct. = 123
U. moorei F. Lloyd = 10
U. muelleri Kamienski 193
U. muelleri auct. = 192
U. multicaulis Oliver 143
U. multicaulis auct. = 142
U. multifida R. Br. 2
U. multiflora Afzel. ex Kamienski = 165
U. multispinosa (Miki) Miki = 188
U. muscosa Benj. = 74
U. mutata (Doll) L. Leiner = 184

U. myriocista A. St. Hil. & Girard 213
U. nagurai Makino = 179
U. nana A. St. Hil. & Girard 137
U. natans Salzm. ex a. St. Hil. & Girard = 179
U. natans Salzm. ex A. St. Hil. & Girard var. *rigida* Salzm. ex A. St. Hil. & Girard = 179
U. naviculata P. Taylor 209
U. nayarii Janarthanam & Henry = 92
U. neglecta Lehm. = 184
U. neglecta Lehm. var. macroptera (G. Brueckner) E.H.L. Krause, end
U. nelumbifolia Gardner 132
U. nelumbifolia Gardner var. *macahensis* Fromm-Trinta = 131, 132
U. neottioides A. St. Hil. & Girard 154
U. neottioides A. St. Hil. & Girard var. *pedicellata* Oliver = 155
U. nepalensis Kitamura = 188
U. nephrophylla Benj. 130
U. nervosa G. Weber ex Benj. 170
U. nervosa G. Weber ex Benj. var. *capillaris* Benj. = 168
U. nervosa G. Weber ex Benj. var. *minor* Merl ex Luetz. = 165
U. nervosa auct. = 165, 168
U. nigrescens Sylven 171
U. nigricaulis Ridley = 37
U. nipponica Makino = 37
U. nipponica Makino forma *albiflora* Komiya = 37
U. nivea Vahl = 43
U. nivea Afzel. ex Kamienski = 56
U. nivea Vahl var. *rosea* (Edgew.) Trimen = 43
U. novae-zelandiae J.D. Hook. 12
U. obovata Miq. = 77
U. obovata G. Weber ex Benj. = Genlisea repens, end
U. obscura R. Br. ex Benth. = 43
U. obsoleta Merl ex Luetz. = 165
U. obtusa Sw. = 179
U. obtusata Sw. = 179
U. obtusiloba Benj. = 43
U. occidentalis A. Gray = 186
U. ochroleuca R. Hartm. 186
U. ochroleuca x intermedia = 186
U. odontosepala Stapf 49
U. odontosperma Stapf = 54
U. odorata Pellegrin 83
U. officinalis Thornton = 182
U. ogmosperma Blatter & McCann = 105
U. oligocista Benj. = 165
U. olivacea Wright ex Griseb. 211
U. oliveri Kamienski = 191, 192
U. oliveri Kamienski var. *fimbriata* Kamienski = 191
U. oliveri Kamienski var. *schweinfurthii* Kamienski = 191
U. oliveriana Steyerm. 155
U. oliveriana Steyerm. forma *parva* Steyerm. = 155
U. oligosperma auct. = 207
U. olygosperma a. St. Hil. = 207
U. ophirensis Ridley = 43
U. oppositiflora R. Br. = 10
U. oppisitiflora Sprengel = 10
U. orbiculata Wallich ex A. DC. = 147
U. orbiculata auct. = 149
U. orinocensis Steyerm. = 59
U. oryzetorum Miq. ex C.B. Clarke = 103
U. ostenii Hicken = 78
U. pachyceras O. Schwarz = 21
U. palatina G. Weber ex Benj. = 214
U. pallens A. St. Hil. & Girard = 179
U. pallens A. St. Hil. & Girard var. *natans* Salzm. ex A. St. Hil. & Girard = 179
U. panamensis Steyerm. ex P. Taylor 71
U. papillosa Stapf = 56
U. paradoxa Lloyd = 90, ?206
U. paradoxa Lloyd & G. Taylor = 90, ?206
U. parkeri Baker = 51
U. parkeri auct. = 53, 54
U. parkeriana A. DC. = 179
U. parthenopipes P. Taylor 63
U. parviflora Buch. Ham. ex Sm. = 106
U. parviflora R. Br. = 40
U. pauciflora Afzel. ex Kamienski = 56
U. pauciflora Blume = 179
U. paucifolia Benj. = 43
U. peckii S.F. Blake = 134
U. pectinata Splitg. ex De Vriese = 60
U. pedicellata Wight = 106
U. peltata Spruce ex Oliver = 56
U. peltatifolia a. Chev. & Pellegrin = 56
U. pentadactyla P Taylor 52
U. peranomala P. Taylor 138
U. perminuta F. Muell. = 9
U. perpusilla A. DC. = 165
U. perpusilla auct. = 115
U. personata LeConte ex Elliott = 136
U. perversa P. Taylor 200
U. petersoniae P. Taylor 69
U. philetas R. Good = 147
U. physoceras P. Taylor 164
U. picta Warm. = 72
U. pierrei Pellegrin 107
U. pilifera A. Chev. = 194
U. pilosa (Makino) Makino = 190
U. pinetoram Standley ex Dwyer & Spellman = Genlisea filiformis, end
U. platensis Speg. 202
U. platyptera Stapf = 194
U. pobeguinii Pellegrin 94
U. poconensis Fromm-Trinta 199
U. podadena P. Taylor 57
U. pollichii F. Schulz = 184
U. polygaloides Edgew. 102
U. polyschista Benj. = 73
U. porphyrophylla Wright ex Griseb. = 204
U. praelonga A. St. Hil. & Girard 73
U. praelonga auct. = 72
U. praeterita P. Taylor 87
U. praetermissa P. Taylor 121

U. prehensilis E. Meyer 113
U. prehensilis E. Meyer var. *hians* (A. DC.) Kamienski = 113
U. prehensilis E. Meyer var. *huillensis* Kamienski = 113
U. prehensilis E. Meyer var. *huillensis* auct. = 54
U. prehensilis E. Meyer var. *lingulata* (Baker) Kamienski = 113
U. prehensilis E. Meyer var. *parviflora* Oliver = 114
U. prehensilis E. Meyer var. *parviflora* DeWild. = 91
U. prehensilis auct. = 109, 112
U. preissii A. DC. = 2, 8
U. protrusa J.D. Hook. = 184
U. pterocalycina O. Schwarz = 83, 84
U. pterosperma Edgew. = 179
U. puberula Benj. = 56
U. puberula Klotzsch = 206
U. pubescens Sm. 56
U. pulchella Lehm. = 187
U. pulcherrima Sylven = 213
U. pulchra P. Taylor 148
U. pumila Walter = ?165, ?179
U. pumila Benj. = 165
U. pumila Raf., end
U. punctata Wallich ex A. DC. 178
U. punctata auct. = 188, 190
U. punctifolia Benj. = 77
U. purpurascens Graham = 106
U. purpurea Walter 212
U. purpurea Willd. ex Benj. = 43
U. purpurea auct. = 198, 213
U. purpureocaerulea A. St. Hil. & Girard 65
U. pusilla Vahl 166
U. pusilla Vahl var. *itapavensis* Merl ex Luetz. = 166
U. pusilla Graham = 147
U. pusilla auct. = 165, 171
U. pygmaea R. Br. = 37
U. quadricarinata Suesseng. = 113
U. quelchii N.E. Br. 127
U. quinquedentata F. Muell. ex P. Taylor 29
U. quinqueradiata Spruce ex Oliver = 205
U. racemosa Wallich ex Walp. = 43
U. racemosa Wallich ex Walp. var. *filicaulis* (Wallich ex A. DC.) C.B. Clarke = 43
U. racemosa Wallich ex Walp. var. *rosea* (Edgew.) Thwaites = 43
U. radiata Small 201
U. ramosa Vahl = 43, 82
U. ramosa Raf., end
U. raynalii P. Taylor 195
U. reclinata Hassk. = 190
U. recurva Lour. = 82
U. reflexa Oliver 194
U. reflexa Oliver var. *parviflora* P. Taylor = 194
U. reflexa Oliver var. *reflexa* = 194
U. reflexa auct. = 179
U. regnellii Sylven = 56
U. recta P. Taylor 110
U. rehmannii Kamienski = 51
U. rendlei F. Lloyd = 165
U. reniformis A. St. Hil. 131
U. reniformis A. St. Hil. var. *kromeri* Ule = 131
U. reniformis A. St. Hil. forma *minor* Luetz. = 131
U. resupinata Greene ex Bigelow 176
U. resupinata auct. = 177
U. reticulata Sm. 103
U. reticulata Sm. var. *parviflora* Santapau = 103
U. reticulata Sm. var. *stricticaulis* Koenig ex Oliver = 92, 102
U. reticulata Sm. var. *ulignosa* (Vahl) C.B. Clarke = 92
U. reticulata Sm. var. *ulignosa* auct. = 102
U. reticulata Oliver = 90
U. rhodocnemis Martius ex Benj. = 207
U. rhododactylos P. Taylor 31
U. rhyterophylla Sander ex Hogg = 76
U. rhytrophylla Sander ex Hogg = 76
U. riccioides A. Chev. = 179
U. rigida Benj. 160
U. robbinsii (Wood) Wood = 183
U. rogersiana Lace = 188
U. roraimensis N.E. Br. = 77
U. rosea Edgew. = 43
U. roseopurpurea Stapf ex Gamble = 43
U. rosulata Benj. = 147
U. rotundifolia F. Lloyd = 10
U. rotundifolia Merl ex Luetz. = 79
U. roxburghii Sprengel = 179
U. rubra Larranaga = 78
U. rubricaulis Tutin = 134
U. saccata Elliott = 212
U. saccata Merl ex Luetz. = 165
U. sacciformis Benj. = 184
U. saharunporensis Royle ex Oliver = 179
U. salwinensis Hand.=Mazz. 44
U. salwinensis auct. = 145
U. salzmannii A. St. Hil. & Girard = 198
U. sampathii Subramanyam & Yoganarasimhan = 43
U. sandersonii Oliver 55
U. sandersonii Oliver var. *treubii* (Kamienski) Kamienski = 55
U. sandwithii P. Taylor 61
U. sanguinea Oliver = 54
U. sanguinea Oliver var. *minor* Kamienski = 54
U. saudadensis Merl ex Luetz. = 129
U. scandens Benj. 109
U. scandens Oliver = 115
U. scandens Benj. subsp. *scandens* = 109
U. scandens Benj. subsp. *schweinfurthii* (Baker ex Stapf) P. Taylor = 109
U. scandens Benj. var. *firmula* (Oliver) Subramanyam & Banerjee = 110
U. scandens Benj. var. *scandens* = 109
U. scandens auct. = 108
U. schimperi Schenk = 126
U. schinzii Kamienski = 51

U. schultesii Fernandez-Perez 70
U. schweinfurthii Baker ex Stapf = 109
U. sciaphila Tutin = 56
U. sclerocarpa Wright ex sauvalle = 136
U. secunda Benj. = 179
U. selloi G. Weber ex Benj. = 77
U. sellowii auct. = 137
U. sematophora Stapf = 54
U. setacea Michx = 165
U. setacea Wallich = 38
U. siakujiensis Nakejima ex Hara = 184
U. siamensis Ostenf. = 37
U. similis Lehm. = 2
U. simplex R. Br. 42
U. simplex Wright ex Sauvalle = 136
U. simulans Pilger 59
U. singeriana F. Muell. 21
U. sinuata Benj. = 54
U. smithiana Wight 93
U. sootepensis Craib = 43
U. spartea Baker = 54
U. spartea Baker var. *marojejensis* Perrier = 54
U. spartea Baker var. *subspicata* Perrier = 54
U. spartioides Scott Elliot ex Perrier = 54
U. spatulata Splitg. ex De Vriese = 77
U. spatulifolia Pilger = 77
U. speciosa R. Br. = 10
U. spectabilis Madauss ex H.R.F. Schreiber = 184
U. spicata Aylven = 100
U. spiralis Sm. 90
U. spiralis Sm. var. *pobeguinii* (Pellegrin) P. Taylor = 94
U. spiralis Sm. var. *spiralis* = 90
U. spiralis Sm. var. *tortilis* (Welw. ex Oliver) P. Taylor = 91
U. spiralis auct. = 91, 115
U. spirandra Wright ex Griseb. = 179
U. spiricaulis Miquel ex Oliver = 103
U. sprengelii Kamienski = 51
U. sprengelii Kamienski var. *acuticeras* Kamienski = 51
U. sprengelii Kamienski var. *humilis* Kamienski = 54
U. spruceana Benth. ex Oliver 177
U. squamosa Benj. = 43
U. squamosa Wight = 95
U. standleyae (Barnhart) Rickett = 77
U. stanfieldii P. Taylor 167
U. stanfieldii auct. = 165
U. stapfiana Mildbr., end.
U. steenisii P. Taylor 145
U. stellaris Linn. F. 192
U. stellaris Linn. F. var. *breviscapa* Kamienski = 192
U. stellaris Linn. F. var. *coromandeliana* A. DC. = 192
U. stellaris Linn. F. var. *dilatata* Kamienski = 192
U. stellaris Linn. F. var. *filiformis* Kamienski = 192
U. stellaris Linn. F. var. *inflexa* (Forsskal) C.B. Clarke = 191
U. stellaris auct. = 190, 191, 193, 205, 207
U. stephensiae F. Lloyd = 208
U. steyermarkii P. Taylor 163
U. stolonifera Benj. = 77
U. striata LeConte ex Torrey 180
U. striata auct. = 197
U. striatula Sm. 147
U. striatula Sm. var. *minor* Ridley = 147
U. striatula auct. = 148
U. stricta G. Meyer = 136
U. stricticaulis (Koenig ex Oliver) Stapf ex Gamble = 102
U. strumosa Solander ex Stapf = 51
U. stygia Thor—see under 186
U. suaveolens Afzel. ex Benj. = 160
U. subpeltata Steyerm. = 56
U. subrecta Lace = 106
U. subsessilis Schltr ex Kamienski = 46
U. subsimilis Colenso = 12
U. subulata L. 165
U. subulata L. var. *cleistogama* A. Gray = 165
U. subulata L. var. *inaequalis* A. DC. = 165, 166, 168
U. subulata L. var. *inaequalis* auct. = 165
U. subulata L. var. *minuta* Kamienski = 165
U. subulata L. var. *tridenticulata* Fernandes = 165
U. subulata L. forma *cleistogama* (A. Gray) Fernald = 165
U. subulata L. forma *minor* Merl ex Luetz. = 165
U. subulata auct. = 166, 170
U. sumatrana Miq. = 82, 179
U. superba G. Weber ex Benj. = Genlisea aurea, end
U. surinamensis Busc. = 59
U. taikankoensis Yamamoto = 147
U. tayloriana Joseph & Mani = 38
U. tenella R. Br. 1
U. tenerrima Merr. = 115
U. tenuicaulis Miki = 184
U. tenuifolia Benj. = 179
U. tenuis Cav. = 179
U. tenuis Cav. var. *poeppigii* A. DC. = 179
U. tenuiscapa Pilger = 165
U. tenuissima Tutin 67
U. tepuiana Steyerm. = 77
U. ternata Sylven = 78
U. terrae-reginae P. Taylor 11
U. tertia Salzm. ex A. St. Hil. & Girard = 166
U. tetraloba P. Taylor 161
U. thomasii Lloyd & G. Taylor = 56
U. thonningii Schum. = 191
U. thonningii Schum. var. *laciniata* Stapf = 191
U. tinguiensis Merl ex Luetz. = 179
U. tortilis Welw. ex Oliver 91
U. tortilis Welw. ex Oliver var. *androngensis* (Welw. ex Hiem) Kamienski = 91, 114
U. tortilis F. Muell. = 84
U. tortilis auct. = 152
U. transrugosa Stapf = 54
U. treubii Kamienski = 55
U. tremulata Salzm. ex A. St. Hil. & Girard = 166

U. tribracteata Hochst. ex A. Rich. = 53
U. trichophylla Spruce ex Oliver 172
U. trichoschiza Stapf = 192
U. tricolor A. St. Hil. 79
U. tricrenata Baker ex Hiem = 179
U. tridactyla P. Taylor 20
U. tridentata Sylven 78
U. triflora P. Taylorf 18
U. triloba Benj. 168
U. triloba R. Good = 165
U. triloba auct. = 165, 170
U. trinervia Benj. 77
U. triphylla Ule = 129
U. troupinii P. Taylor 47
U. tubulata F. Muell. 23
U. turumiquirensis Steyerm. = 77
U. uligenoides Wight = 106
U. uliginoides Wight = 106
U. uliginoides auct. = 91
U. uliginosa Vahl 92
U. uliginosa auct. = 86, 106
U. uniflora R. Br. 14
U. uniflora Spruce ex Oliver = 177
U. unifolia Ruiz & Pavon 123
U. vaga Griseb. = 198
U. venezuelana Steyerm. = 56
U. velascoensis Kuntze = 77
U. verapazensis Morong ex J. D. Sm. = 126
U. versicolor Benj. = 77
U. verticillata Benj. = 173
U. verticillata Salsm. ex A. St. Hil. & Girard = 198
U. villosula Stapf = 206
U. violacea R. Br. 9
U. violacea Barton = 212
U. virgatula Barnhart = 136
U. viscosa Spruce ex Oliver 153
U. vitellina Ridley 117
U. volubilis R. Br. 5
U. volubilis Wight ex Benj. = 109
U. vulcanica Colenso = 12
U. vulgaris L. 182
U. vulgaris L. subsp. *macrorhiza* (LeConte) Clausen = 183
U. vulgaris L. var. *americana* A. Gray = 183
U. vulgaris L. var. *formosana* Kuo = 184
U. vulgaris L. var. *japonica* (Makino) Yamanaka = 184
U. vulgaris L. var. *mutata* Doll = 184
U. vulgaris L. var. *neglecta* (Lehm.) cosson & Germain = 184
U. vulgaris L. var. *pilosa* Makino = 190
U. vulgaris L. var. *tenuicaulis* (Miki) Kuo = 184
U. vulgaris L. var. *typica* Meister = 182
U. vulgaris L. forma *tenuicaulis* (Miki) Komiya = 184
U. vulgaris L. forma *tenuis* Saelan = 184
U. vulgaris auct. = 183, 184, 190, 207
U. wallichiana Benj. = 82
U. wallichiana F. Muell. = 83, 84
U. wallichiana Wight = 109
U. wallichiana Wight var. *firmula* Oliver = 110
U. wallichii Wight = 109
U. warburgii Goebel 44
U. warmingiana auct. = 196
U. warmingii Kamienski 196
U. welwitschii Oliver 48
U. welwitschii Oliver var. *microcalyx* P. Taylor = 50
U. welwitschii Oliver var. *odontosepala* (Stapf) P. Taylor = 49
U. welwitschii Oliver var. *pusilla* Suesseng. = 48
U. welwitschii Oliver var. *welwitschii* = 48
U. welwitschii auct. = 47, 51
U. westonii P. Taylor 3
U. wightiana P. Taylor 95
U. williamsii Steyerm. = 77
U. yakusumensis Masamune = 92
Vesiculina Raf. = #35
Vesiculina Raf. subgenus *Hydrion* Barnhart = #35
Vesiculina Raf. subgenus *Pemphigena* Barnhart = #35
V. albiflora (R. Br.) Raf. = 28
V. compressa (R. Br.) Raf. = U. compressa, end
V. cucullata (A. St. Hil. & Girard) Barnhart = 214
V. gibba (L.) Raf. = 179
V. graminifolia (Vahl) Raf. = 106
V. purpurea (Walter) Raf. = 212
V. pygmaea (R. Br.) Raf. = 37
V. saccata (Elliott) Raf. = 212
V. tenella (R. Br.) Raf. = 165
Xananthes Raf. = #34
X. minor (L.) Raf. = 188

3 5185 00225 126

A Revised World List of the *Genlisea* St. Hil.

By Peter Taylor

G. africana auct. = stapfii A. Chev.
G. africana Oliv. tr. Af
G. africana f. *pallida* Fries = africana Oliv.
G. africana Oliv. ssp. *stapfii* (A. Chev.) P. Taylor = stapfii A. Chev.
G. anfractuosa Tutin = filiformis St. Hil.
G. angolensis Good Ang., Zaire
G. aurea St. Hil. Bra.
G. biloba Benj. = violacea St. Hil.
G. cylindrica Sylven = violacea St. Hil.
G. esmeraldae Steyerm. = pygmaea St. Hil.
G. filiformis St. Hil. Bra., Ven., Guy., Cuba, Col., Bel., Bol., Gua.
G. glabra P. Taylor Ven.
G. glandulosissima Fries Zam.
G. guianensis N.E. Br. Guy., Ven., Bra.
G. hispidula Stapf tr. & S. Af.
G. hispidula Stapf ssp. *subglabra* (Stapf) P. Taylor = subglabra Stapf
G. luetzelburgii Merl ex Leutz. nom. nud. = guianensis N. E. Br.
G. lobata Fromm-Trinta Bra.
G. luteoviridis Wright = filiformis St. Hil.
G. margaretae Hutch. Zam., Madag., Tan.
G. minor St. Hil. = aurea St. Hil.
G. nigrocaulis Steyerm. = pygmaea St. Hil.
G. ornata Mart. ex Benj. = aurea St. Hil.
G. ornata Mart. ex Benj. var. *gracilis* Merl ex Luetz. nom. nud. = aurea St. Hil.
G. oxycentron P. Taylor = pygmaea St. Hil.
G. pallida Fromm-Trinta & P. Taylor Ang., Zam.
G. pulchella Tutin = repens Benj.
U. pusilla Warm. = repens Benj.
G. pygmaea St. Hil. Bra., Ven., Guy., Col., Trin.
G. recurva Bosser = margaretae Hutch.
G. reflexa Benj. = violacea St. Hil.
G. repens Benj. Bra., Ven., Guy., Par., Sur.
G. roraimensis N. E. Br. Ven.
G. sanariapoana Steyerm. Ven.
G. stapfii A. Chev. W & C Af.
G. subglabra Stapf E Af.
G. subviridis Hutch. = africana Oliv.
G. uncinata P. Taylor & Fromm-Trinta Bra.
G. violacea St. Hil. Bra.
Utricularia foliosa Salzm. ex A. DC. = filiformis St. Hil.
U. obovata G. Web. ex Benj. = repens
U. pinetorum Standley ex Dwyer & Spellman nom. nud. = filiformis St. Hil.
U. superba G. Web. ex Benj. = aurea St. Hil.